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**APPLICATION NUMBER: 60/468,508**

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**RELATED PCT APPLICATION NUMBER: PCT/US04/13880**

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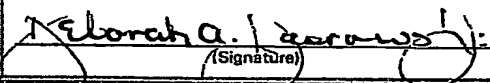
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Attorney Docket No. 026032-4346

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Anderson et al.  
Title: ATTACHMENT  
SYSTEM FOR  
MODULES IN A  
VEHICLE  
Application No.: To be determined  
Filing Date: To be determined  
Art Unite: To be determined

<b>CERTIFICATE OF EXPRESS MAILING</b>	
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Attorney Docket No.: 026032-4346

Mail Stop **PROVISIONAL PATENT APPLICATION**  
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PO Box 1450  
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**PROVISIONAL PATENT APPLICATION**  
**TRANSMITTAL**

Transmitted herewith for filing under 37 C.F.R. § 1.53(c) is the provisional patent application of:

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Enclosed are:

- ☒ Application Data Sheet (37 C.F.R. § 1.76) (8 pages).
- ☒ Specification and Abstract (14 pages).
- ☒ Informal drawings (26 sheets, Figures 1-25).

The filing fee is calculated below:

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- ☒ Check No. 12308 in the amount of \$160.00 to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1447. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Assistant Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1447.

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Respectfully submitted,

Date MAY 7, 2003

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**Application Data Sheet****Application Information**

<b>Application Type:</b>	Provisional
<b>Subject Matter:</b>	Utility
<b>Suggested classification:</b>	
<b>Suggested Group Art Unit:</b>	
<b>CD-ROM or CD-R:</b>	None
<b>Computer Readable Form (CRF):</b>	No
<b>Title:</b>	ATTACHMENT SYSTEM FOR MODULES IN A VEHICLE
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<b>Total Drawing Sheets:</b>	26
<b>Small Entity:</b>	No
<b>Petition included:</b>	No
<b>Secrecy Order in Parent Application:</b>	No

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#### Domestic Priority Information

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**Foreign Priority Information**

<b>Country:</b>	<b>Application number:</b>	<b>Filing Date:</b>	<b>Priority Claimed:</b>

**Assignee Information**

**Assignee name:** Johnson Controls Technology Company

Attorney Docket No.: 026032-4346

**U.S. PROVISIONAL PATENT APPLICATION**  
**for**  
**ATTACHMENT SYSTEM FOR MODULES IN A VEHICLE**

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Attorney Docket No.: 026032-4346

## **ATTACHMENT SYSTEM FOR MODULES IN A VEHICLE**

### **CROSS REFERENCE TO RELATED APPLICATIONS**

**[0001]** The following patent applications are hereby incorporated by reference: U.S. Patent Application No. 09/846,811 titled "Modular System for a Vehicle" filed May 1, 2001 and U.S. Patent Application No. 10/316,162 titled "Modular System for a Vehicle" filed December 10, 2002.

### **FIELD**

**[0002]** The present invention relates to an attachment system for modules for a vehicle. The present invention relates more particularly to a system for interchangeably attaching modules for use in a vehicle. The present invention relates more particularly to a system for attaching modules for use in an overhead system for a vehicle.

### **BACKGROUND**

**[0003]** Placement of modules for use in an overhead location or other location of a vehicle are generally known and may include one or more modules such as storage compartments, bins, instrumentation, entertainment devices and the like. Such modules are typically formed with (or attached to) a console or other trim piece, in which the modules are often permanently, or semi-permanently, attached to the internal structure of the vehicle by attachment devices such as threaded fasteners, spring-clips or the like.

**[0004]** However, such known attachment devices typically are not intended to permit a user to conveniently remove one module and replace it with another module. Such known attachment devices also do not usually provide a user with the capability to rearrange the position of several modules, or to customize the content and position of the modules within the vehicle in a convenient manner.

Attorney Docket No.: 026032-4346

**[0005]** Accordingly, it would be advantageous to provide an attachment system for modules that provides secure retention of the module within the vehicle. It would also be advantageous to provide an attachment system for a vehicle that provides secure retention of the module in a vertical direction and a horizontal direction. It would also be advantageous to provide an attachment system for modules that permits the module to be easily and conveniently installed, removed, or replaced with other modules. It would be further advantageous to provide an attachment system for modules that is configured for concealment within the module to enhance the aesthetic appearance of the module. It would be further advantageous to provide an attachment system for modules that is configured to fit within a compartment along a surface of the module to minimize inadvertent contact with the attachment system.

**[0006]** Accordingly, it would be advantageous to provide an attachment system for a module having any one or more of these or other advantageous features.

### SUMMARY

**[0007]** The present invention relates to an attachment system for coupling a module to a rail member on an interior portion of a vehicle and includes a module having a latching member attached thereto. The latching member includes a lever pivotally coupled to a pin and configured to operably engage a recess on the rail member by a quarter-turn of the lever.

**[0008]** The present invention also relates to an attachment system for coupling a module to a vehicle and includes a rail member positioned along an interior surface of the vehicle. A module is configured to be releasably positioned on the rail member, and a pin member is coupled to the module and has a hook configured to releasably engage the rail member when the pin member is rotated approximately 90 degrees.

Attorney Docket No.: 026032-4346

**[0009]** The present invention further relates to an attachment system for coupling a module to a vehicle and includes a rail member positioned along an interior surface of the vehicle and a module configured to be releasably positioned on the rail member. A latch device is configured to couple the module to the rail member. The latch device has a hook member pivotally coupled to a lever so that movement of the lever operates the hook as an over-center type device to releasably engage the rail member.

**[0010]** The present invention further relates to an attachment system for coupling a module to a vehicle and includes a rail member positioned along an interior surface of the vehicle and a module configured to be releasably positioned on the rail member. A latch member is configured to couple the module to the rail member. The latch member has a flange portion that is biased to coact with a recess on the rail member when the module is positioned on the rail member.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0011]** FIGURE 1 is a schematic representation of a front perspective view of a module attached to an interior structure of a vehicle according to an exemplary embodiment.

**[0012]** FIGURE 2 is a schematic representation of a bottom view and an end view of an interior structure of a vehicle of the embodiment of FIGURE 1 according to an exemplary embodiment.

**[0013]** FIGURE 3 is a graphic image of an exploded back perspective view of an attachment system for a module for a vehicle according to a preferred embodiment.

**[0014]** FIGURE 4 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.



Attorney Docket No.: 026032-4346

**[0015]** FIGURE 5 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

**[0016]** FIGURE 6 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

**[0017]** FIGURE 7 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

**[0018]** FIGURE 8 is a schematic representation of an assembly view of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

**[0019]** FIGURE 9 is a schematic representation of a front perspective view of an attachment system for a module according to another preferred embodiment.

**[0020]** FIGURE 10 is a schematic representation of a front view of an attachment system for a module according to the embodiment of FIGURE 9.

**[0021]** FIGURE 11 is a schematic representation of an exploded perspective view of an attachment system for a module according to the embodiment of FIGURE 9.

**[0022]** FIGURE 12 is a schematic representation of a cross sectional view of an attachment system for a module according to the embodiment of FIGURE 9.

**[0023]** FIGURE 13 is a schematic representation of an exploded perspective view of an attachment system for a module according to the embodiment of FIGURE 9.

Attorney Docket No.: 026032-4346

**[0024]** FIGURE 14 is a schematic representation of an exploded perspective view of an attachment system for a module according to the embodiment of FIGURE 9.

**[0025]** FIGURE 15 is a schematic representation of a front perspective view of an attachment system for a module according to another preferred embodiment.

**[0026]** FIGURE 16 is a schematic representation of a cross sectional view of an attachment system for a module according to the embodiment of FIGURE 15.

**[0027]** FIGURE 17 is a schematic representation of a perspective view of a portion of an attachment system for a module according to the embodiment of FIGURE 15.

**[0028]** FIGURE 18 is a schematic representation of a cross sectional view of an attachment system for a module according to an alternative of the embodiment of FIGURE 15.

**[0029]** FIGURE 19 is a schematic representation of a cross sectional view of an attachment system for a module according to the embodiment of FIGURE 18.

**[0030]** FIGURE 20 is a schematic representation of a perspective view of a portion of an attachment system for a module according to the embodiment of FIGURE 18.

**[0031]** FIGURE 21 is a graphic image of a series of perspective views of an attachment system for a module according to another preferred embodiment.

**[0032]** FIGURES 22A through 22C are schematic diagrams of the attachment system of FIGURE 21 in various stages of deployment.

Attorney Docket No.: 026032-4346

**[0033]** FIGURE 23 is a schematic representation of a front perspective view of an attachment system for a module according to another preferred embodiment.

**[0034]** FIGURE 24 is a graphic image of a perspective view of the attachment system of FIGURE 23.

**[0035]** FIGURE 25 is a graphic image of a plan view of the attachment system of FIGURE 23.

#### **DETAILED DESCRIPTION OF THE PREFERRED AND OTHER EXEMPLARY EMBODIMENTS**

**[0036]** The attachment system for a module is shown and described for modules configured to attach to an overhead portion of a vehicle individual (shown schematically as "rails" or other elongated members positioned on an "A" surface of a "headliner" or panel). However, the description of the various embodiments of the attachment system for a module are equally applicable to attachment systems for other locations within a vehicle, such a floor areas, cargo storage areas, seat backs, side panels, etc.

**[0037]** Referring to FIGURE 1, a module for use in a vehicle is shown schematically positioned on an overhead panel (such as the A surface of a headliner, etc.) within the vehicle and attached to elongated members shown schematically as rail members. The modules are configured to be conveniently installed, removed, replaced and repositioned along the rails by the attachment system. Referring to FIGURE 2, one embodiment of the rail is shown schematically as including recesses that extend longitudinally along a side area, an opening that extends longitudinally along a lower surface, and a flange member that extends longitudinally along an upper edge and having apertures. According to various embodiments of the attachment system, the recesses, openings and/or apertures are configured to coact with structure provided on the modules to permit the modules to be conveniently and

Attorney Docket No.: 026032-4346

securely attached or coupled to the vehicle interior (e.g. such as via the rails). Dimensions for the rail member are shown according to an exemplary embodiment in units of millimeters.

**[0038]** Referring to FIGURE 3, an attachment system for a module is shown according to one preferred embodiment. The attachment system includes a latch member positioned on each side of the module. The module includes projections shown schematically as "teeth" configured to engage the apertures on the rails that are intended to minimize the tendency of the module to "slide" or otherwise move along the rails (e.g. X-axis direction) during rapid vehicle deceleration or impact events (e.g. collisions, etc.). The latch member is configured to operate as a Y-axis, quarter-turn latching device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

**[0039]** Referring to FIGURES 4 and 5, the latch member is shown having a handle portion (e.g. lever, etc.) pivotally coupled to pin member (e.g. axle, etc.). The axle has a spring member and a "foot" (e.g. hook, lobe, tab, etc.) configured to coact with the recess on the rail.

**[0040]** Referring to FIGURE 6, the attachment system is actuated by aligning the handle portion axially with the pin member and positioning the handle portion and pin member so that the foot is approximately horizontal and configured to fit into the recess on the rail. The handle portion and pin member are moved inwardly against the spring force to position the foot within the recess. Referring to FIGURE 7, the handle portion is rotated approximately 90 degrees (e.g. a quarter turn) so that the foot is rotated upward within the recess, and then the handle portion is rotated downward (approximately 90 degrees) to a stowed position along the side of the module. FIGURE 8 provides additional construction and assembly details for the attachment system of FIGURE 3 according to an exemplary embodiment.

Attorney Docket No.: 026032-4346

**[0041]** Referring to FIGURES 9 and 10, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch member positioned on one or both sides of the module and positioned for concealment behind a movable panel (shown schematically as a spring-biased, pivotal "door"). The latch member is configured to operate as a Z-axis, quarter-turn latching device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

**[0042]** Referring to FIGURES 11 and 12, the latch member has a handle portion configured for a quarter-turn rotation by a user to actuate and release the attachment system. The handle portion is shown as rigidly (e.g. integrally, etc.) formed with a pin member (e.g. axle, etc.) having two "feet" (e.g. lobes, hooks, projections, etc.) extending therefrom. The feet are oriented on the pin member such that the feet are aligned with the opening along the bottom of the rail when the handle portion is in the "unlocked" position so that the pin member and feet may enter the opening as the module is positioned onto the rails. The handle member may then be rotated approximately 90 degrees to a "locked" position in which the feet are configured to coact with the rail by engaging an inside and outside section of the rail. According to alternative embodiments, a single foot may be provided and configured to engage the inside section of the rail, or two feet may be provided and oriented generally opposite each other on the pin member so that the feet engage opposite sections that are inside of the rail.

**[0043]** Referring to FIGURES 13 and 14, the attachment system is shown assembled and positioned behind a spring-biased door. The door may be pivoted or rotated to provide access to the handle member for actuation of the handle member between the locked position and the unlocked position. The spring is intended to bias the door to a normally "closed" position.

Attorney Docket No.: 026032-4346

**[0044]** Referring to FIGURES 15 and 16, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch member positioned on one or both sides of the module and positioned for concealment behind a movable panel (shown schematically as a spring-biased, pivotal "door"). The latch member is configured to operate as a Z-axis, quarter-turn latching device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

**[0045]** Referring to FIGURES 15 through 17, the latch member has a handle portion (shown schematically having a "slot" for receiving a "thin" object such as a coin, etc.) configured for a quarter-turn rotation by a user to actuate and release the attachment system. The handle portion is shown as rigidly (e.g. integrally, etc.) formed with a pin member (e.g. axle, etc.) having two "feet" (e.g. lobes, projections, etc.) extending therefrom. The feet are oriented on the pin member such that the feet are aligned with an opening along the flange of the rail when the handle portion is in the "unlocked" position so that the pin member and feet may enter the opening as the module is positioned onto the rails. The handle member may then be rotated approximately 90 degrees to a "locked" position in which the feet are configured to coact with the rail by engaging an inside and outside section of the rail. The pin member also includes a projection configured to engage the apertures on the rail when the module is positioned on the rail and is intended to provide structure that will minimize the tendency of the modules to move or slide along the rails during collisions or other events. According to alternative embodiments, a single foot may be provided and configured to engage the inside section of the rail, or two feet may be provided and oriented generally opposite each other on the pin member so that the feet engage opposite sections that are inside of the rail.

Attorney Docket No.: 026032-4346

**[0046]** Referring to FIGURES 18 through 20, an attachment system is shown according to an alternative embodiment of the attachment system of FIGURES 15 through 17. As shown schematically, the pin member may be formed with suitable "feet" or other projections to align in a locking engagement with a modified structural shape of the rail.

**[0047]** Referring to FIGURE 21, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch device positioned on one or both sides of the module and configured for movement to a "stowed" or "locked" position within a compartment on the module such that the latch member is generally flush with the surface of the module. The latch device is configured to operate as an over-center device (e.g. "clamp," etc.) to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis) and longitudinal horizontal (e.g. X-axis) directions. As shown in FIGURE 21, the latch device has a handle portion (such as a lever, etc.) pivotally coupled to a bracket and to a hook member. The hook member has a "hooked" portion that is configured to engage an edge or other surface on the rail in a secure relationship. The hook member also includes a threaded interface that permits the length of the hook member to be adjusted to provide a desired degree of clamping force on the rail when the latching device is in the "locked" position.

**[0048]** Referring to FIGURES 22A through 22C, the latching device is shown operating through a range of motion from an "unlocked" position to a "locked" position. The handle portion is rotated outwardly to move the hook member upward to provide sufficient clearance for the hooked portion to engage the rail. The handle portion is then rotated upwardly about the pivotal coupling toward a stowed position, which draws the hook member downward into engagement with the rail. The desired degree of "clamping" force exerted by the hook member on the rail may be adjusted by varying the appropriate lengths of the latching device members or by adjusting the length of the hook member.

Attorney Docket No.: 026032-4346

**[0049]** Referring to FIGURE 23, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch member positioned on one or both sides of the module and configured for movement to a "stowed" or "locked" position within a compartment along the side of the module so that the surface of the latch member is generally flush with the surface of the module. The latch member is configured to operate as a spring-biased, Y-axis device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

**[0050]** Referring to FIGURES 23 through 25, the latch member has a first end pivotally coupled to the module and a second end spring biased inwardly toward a "locked" position on the module, where the latch member is recessed generally flush with the module to provide a smooth and uniform appearance. The latch member has a retainer (e.g. flange, etc.) disposed between the first end and second end that is configured to coact with the recess on the side of the rail when the retainer is in the locked position. As shown in FIGURE 23, the retainer is configured to extend through an opening (shown as a slot) in a side of the module so that the retainer can extend into a recess on the side of the rail. The attachment system is intended to operate so that when the module is positioned upwardly against the rails, the retainer(s) will be forced in an outwardly direction by the contour of the rails against the spring biasing force until the module is positioned over the rails and the retainers are aligned with the recesses. The spring bias on the latch member is intended to urge the retainers into the locked position to prevent movement of the module in the vertical (e.g. Z-axis) direction. The latch member may be moved from the locked position to an unlocked position by manually rotating the second end of the latch member outwardly against the spring bias to disengage the retainers from the recesses. According to any preferred embodiment, the retainer may be formed of any suitable material (e.g. steel, aluminum, plastic, etc.) in any suitable thickness to provide the desired strength and sheer loading capacity. The surface of the material of



Attorney Docket No.: 026032-4346

the retainer may also be provided with any suitable finish. For example, the material surface may be textured to promote a frictional interface between the retainer and the rail to inhibit movement of the module along the rail. The latching member may also be provided with projections configured to engage apertures on the rail to minimize the tendency of the modules to slide along the rails.

**[0051]** According to any preferred embodiment, the attachment system for a module for a vehicle is intended to provide an attachment system that is easily and conveniently accessible and operable by a wide variety of users to remove, replace, reposition, and/or install one or more modules within a vehicle, such as within or in connection with, an overhead system for a vehicle having one or more elongated members such as rails. The components of the various embodiments of the attachment system are intended to provide a lightweight, rugged, reliable and durable structure for attaching the modules to the rails (or other structure) within the vehicle. The components may be made of any suitable material such as plastic (e.g. ABS plastic, etc.), metal (e.g. aluminum, steel, etc.) or other materials that provide the desired strength to retain the modules on the rails during all appropriate loading conditions and scenarios.

**[0052]** It is important to note that the construction and arrangement of the elements of the various embodiments of the attachment system provided herein is illustrative only. Although only a few exemplary embodiments of the present inventions have been described in detail in this disclosure, those skilled in the art who review this disclosure will readily appreciate that many modifications are possible in these embodiments (such as variations in handle and pin member configurations, shape and size, mounting arrangements, rotational and pivoting arrangements, use of colors, combinations of shapes, etc.) without materially departing from the novel teachings and advantages of the inventions. Further, the attachment system may be used in any type of vehicle such as trucks, recreational vehicles, minivans, sport utility vehicles,

Attorney Docket No.: 026032-4346

passenger automobiles, etc. and at any suitable location within the vehicle (such as floors, cargo storage areas, etc.). Accordingly, all such modifications are intended to be within the scope of the invention as defined in the appended claims.

**[0053]** The order or sequence of any process or method steps may be varied or re-sequenced according to alternative embodiments. In the claims, any means-plus-function clause is intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures. Other substitutions, modifications, changes and omissions may be made in the design, operating configuration and arrangement of the preferred and other exemplary embodiments without departing from the spirit of the inventions as expressed in the appended claims.

Attorney Docket No.: 026032-4346

**ABSTRACT**

An attachment system for coupling a module to a rail member on an interior portion of a vehicle is disclosed and includes a module having a latching member attached thereto. The latching member includes a lever coupled to a pin and configured to operably engage a recess on the rail member by a quarter-turn of the lever. An attachment system for coupling a module to a vehicle is also disclosed and includes a rail member positioned along an interior surface of the vehicle and a module configured to be releasably positioned on the rail member. A latch device is configured to couple the module to the rail member. The latch device has a hook member pivotally coupled to a lever so that movement of the lever operates the hook as an over-center device to releasably engage the rail member.

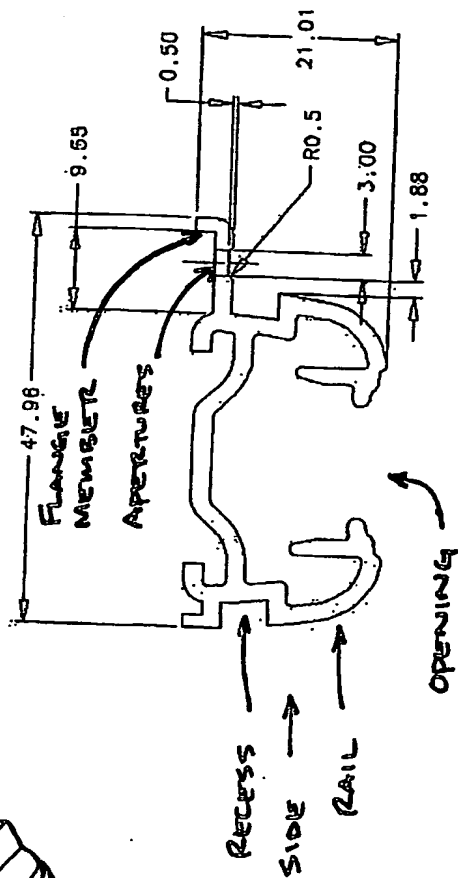
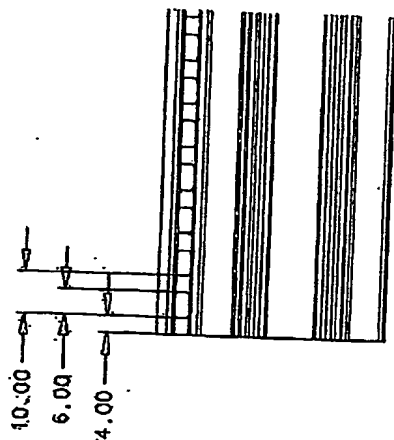
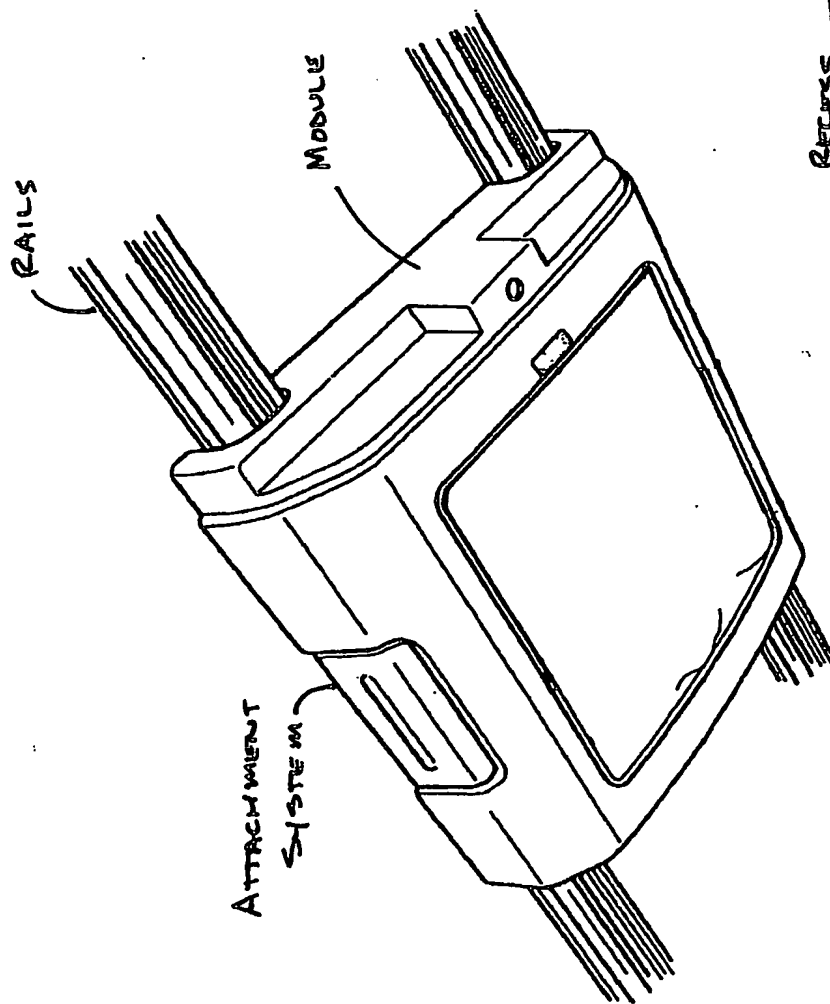


FIGURE 1

FIGURE 2

2/26

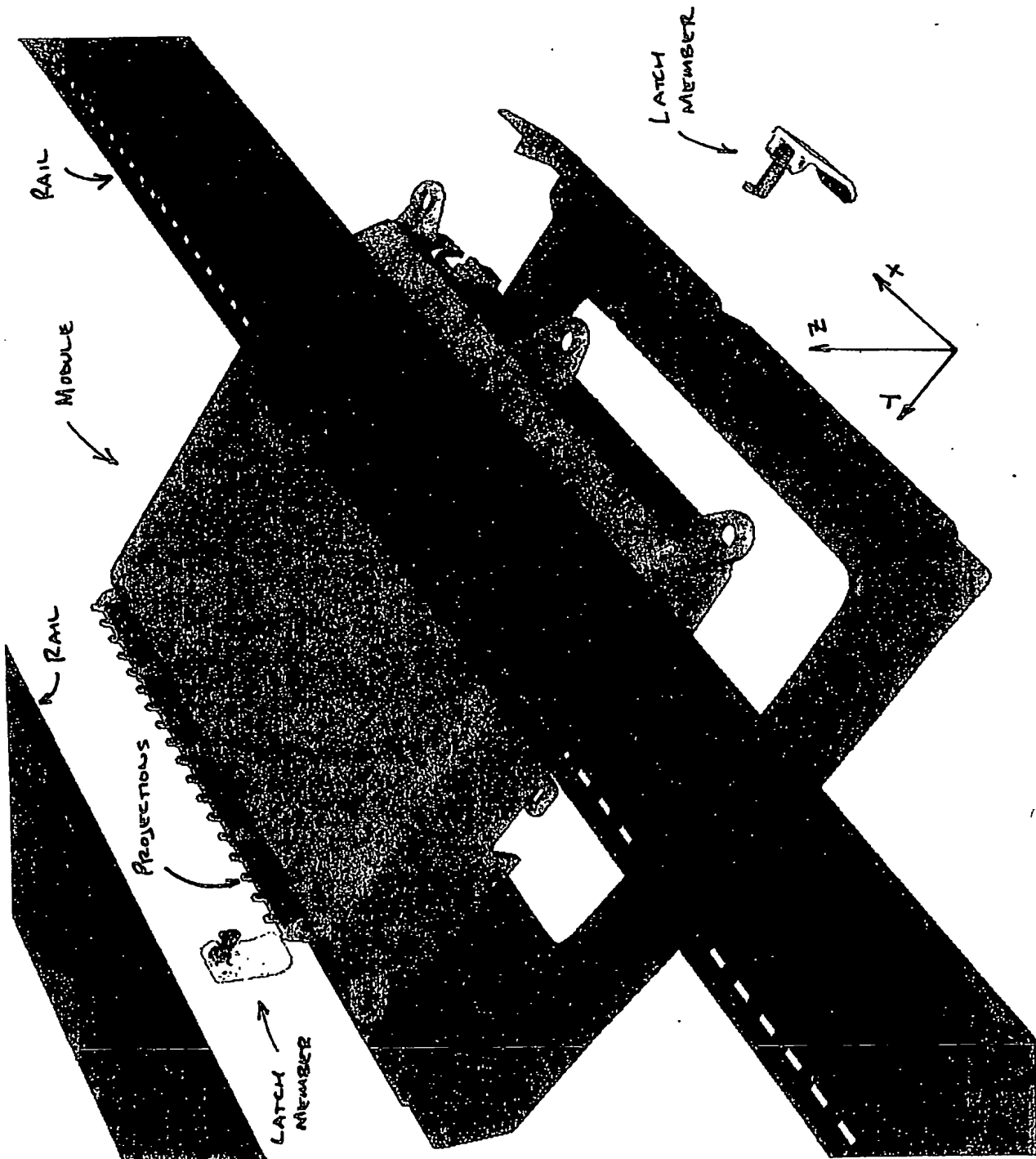


FIGURE 3

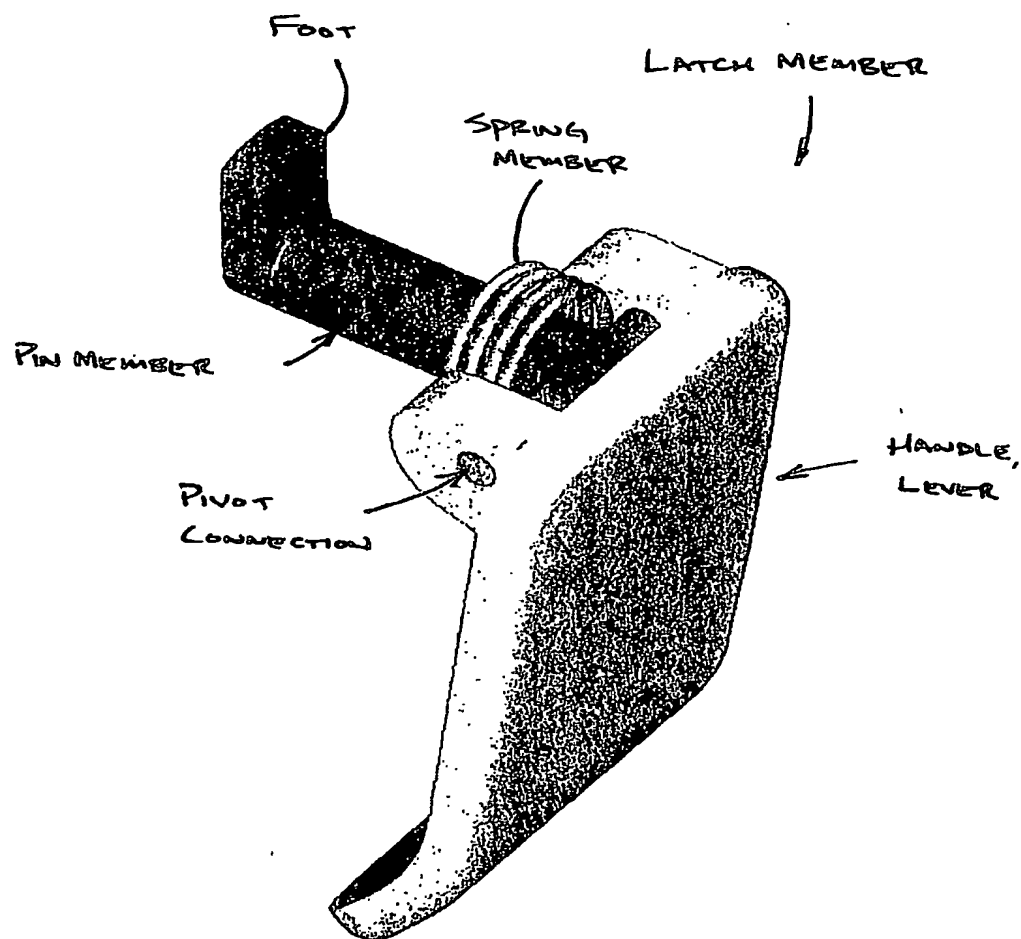


FIGURE 4

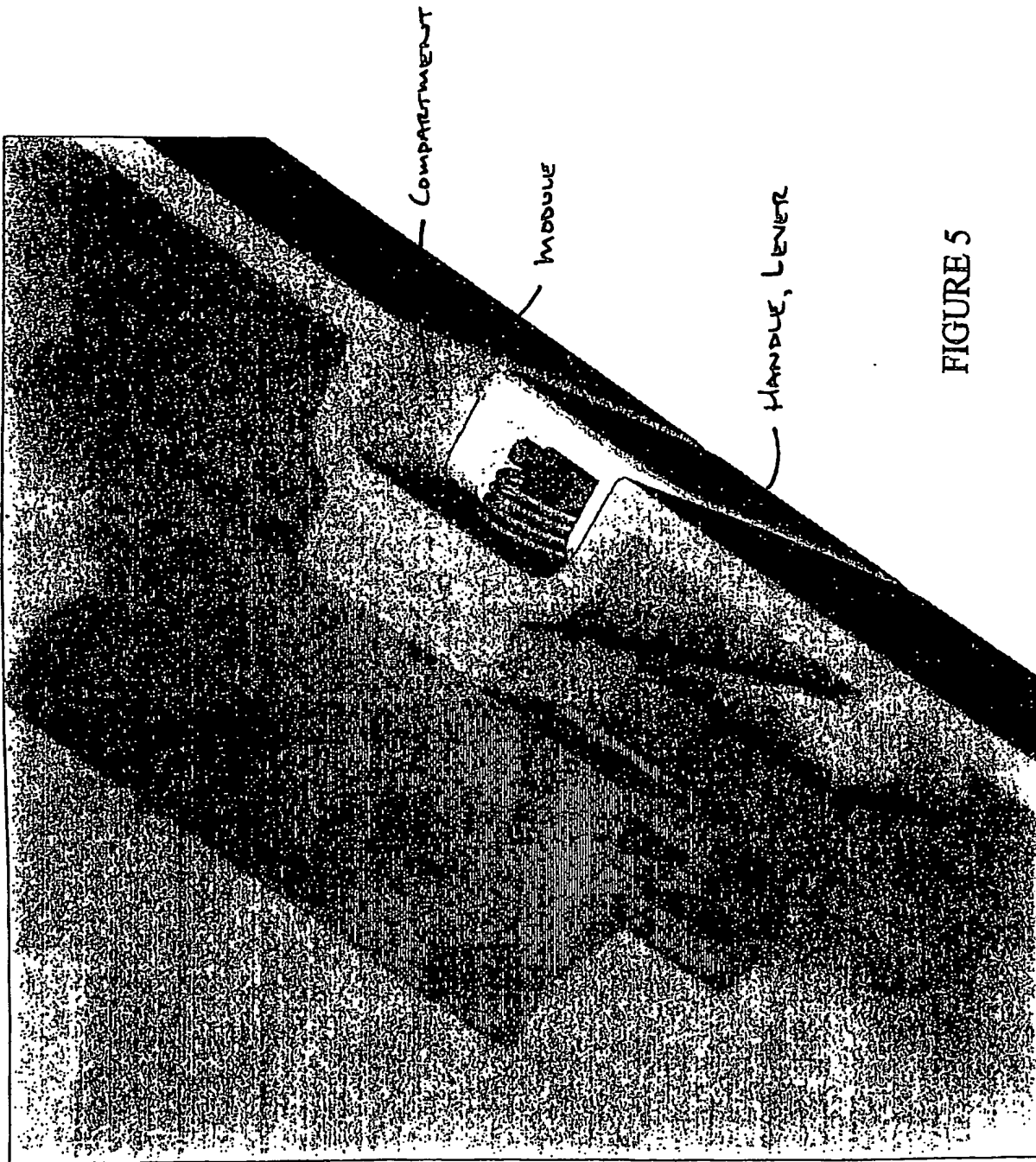


FIGURE 5

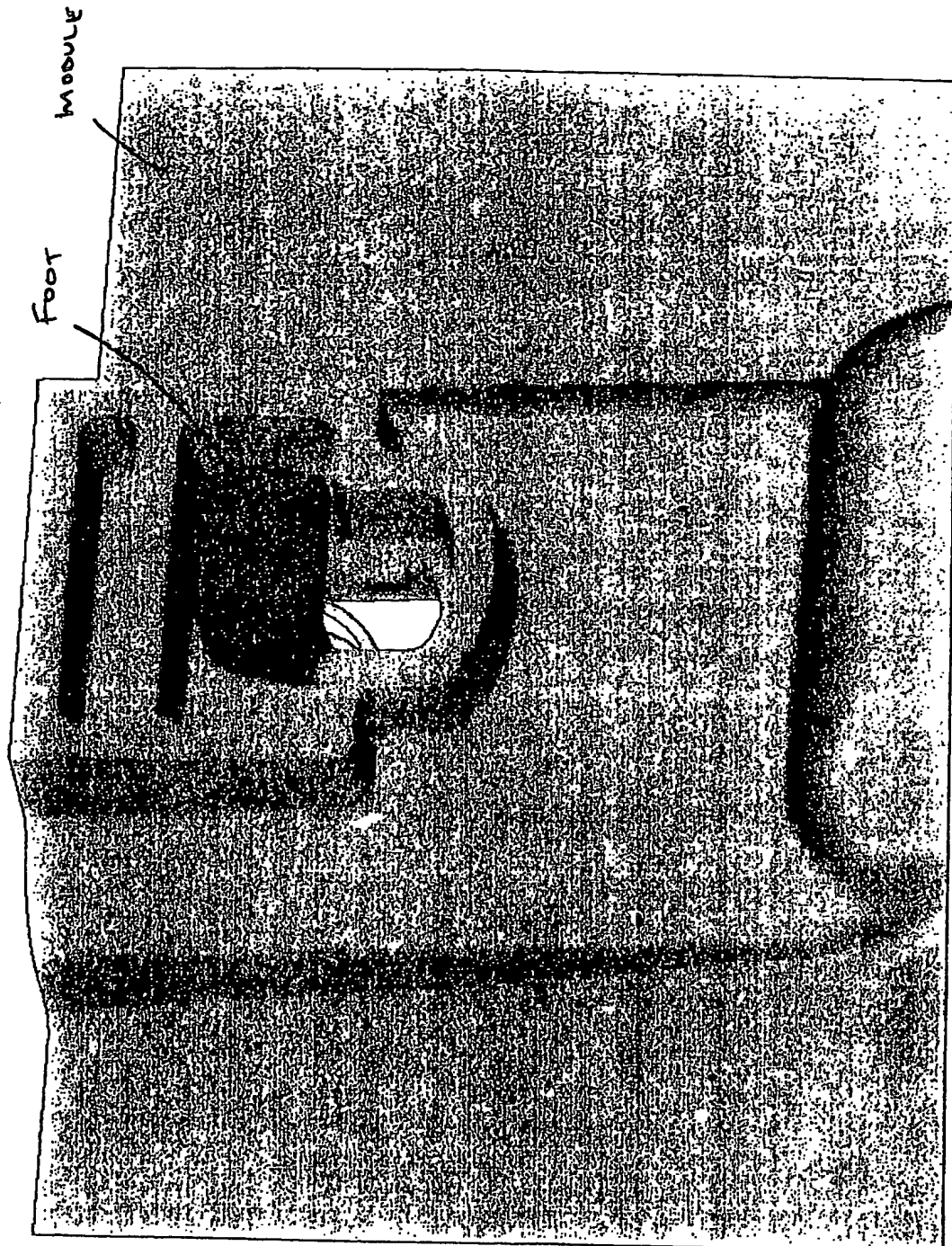


FIGURE 6



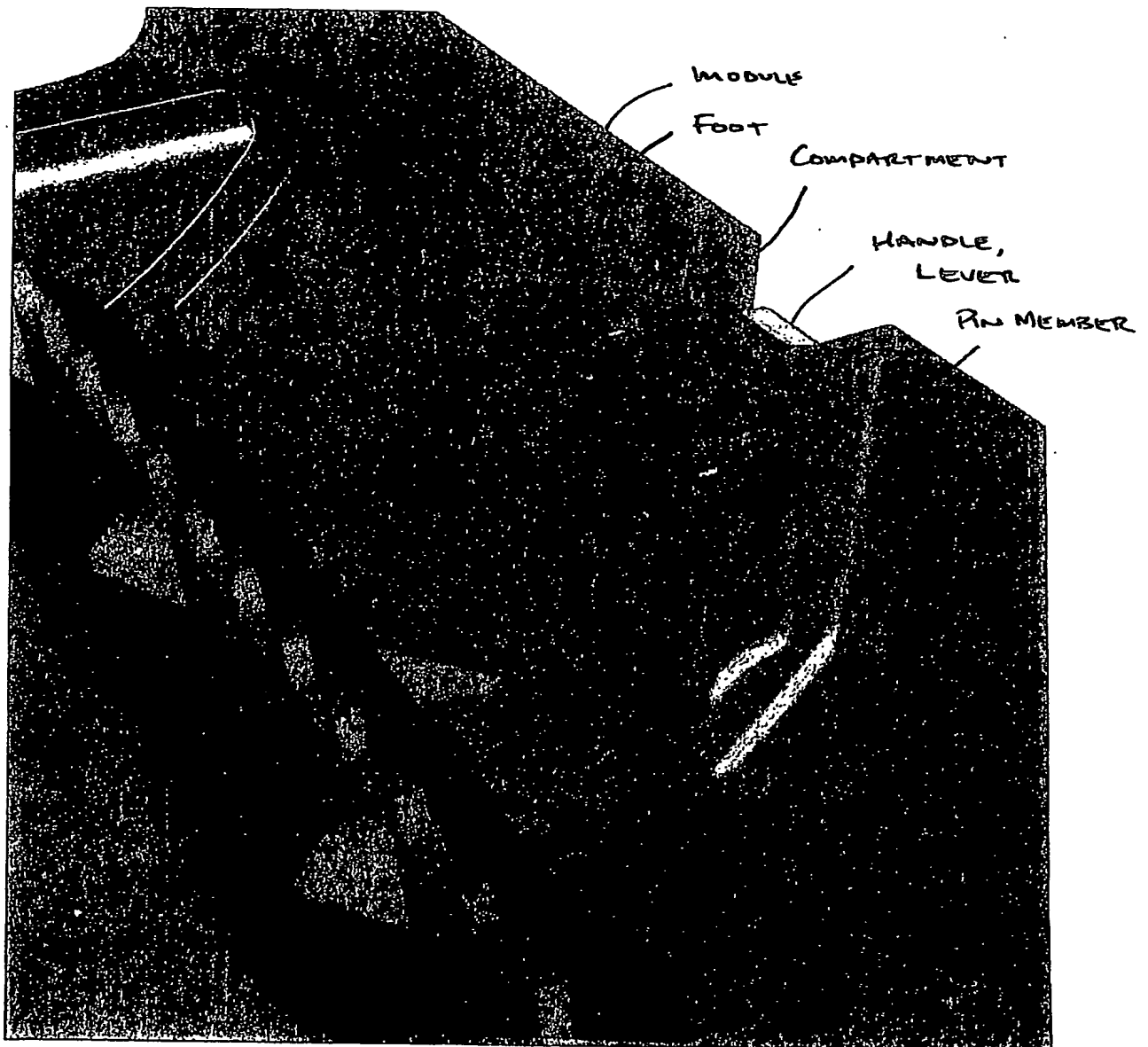


FIGURE 7



8/26

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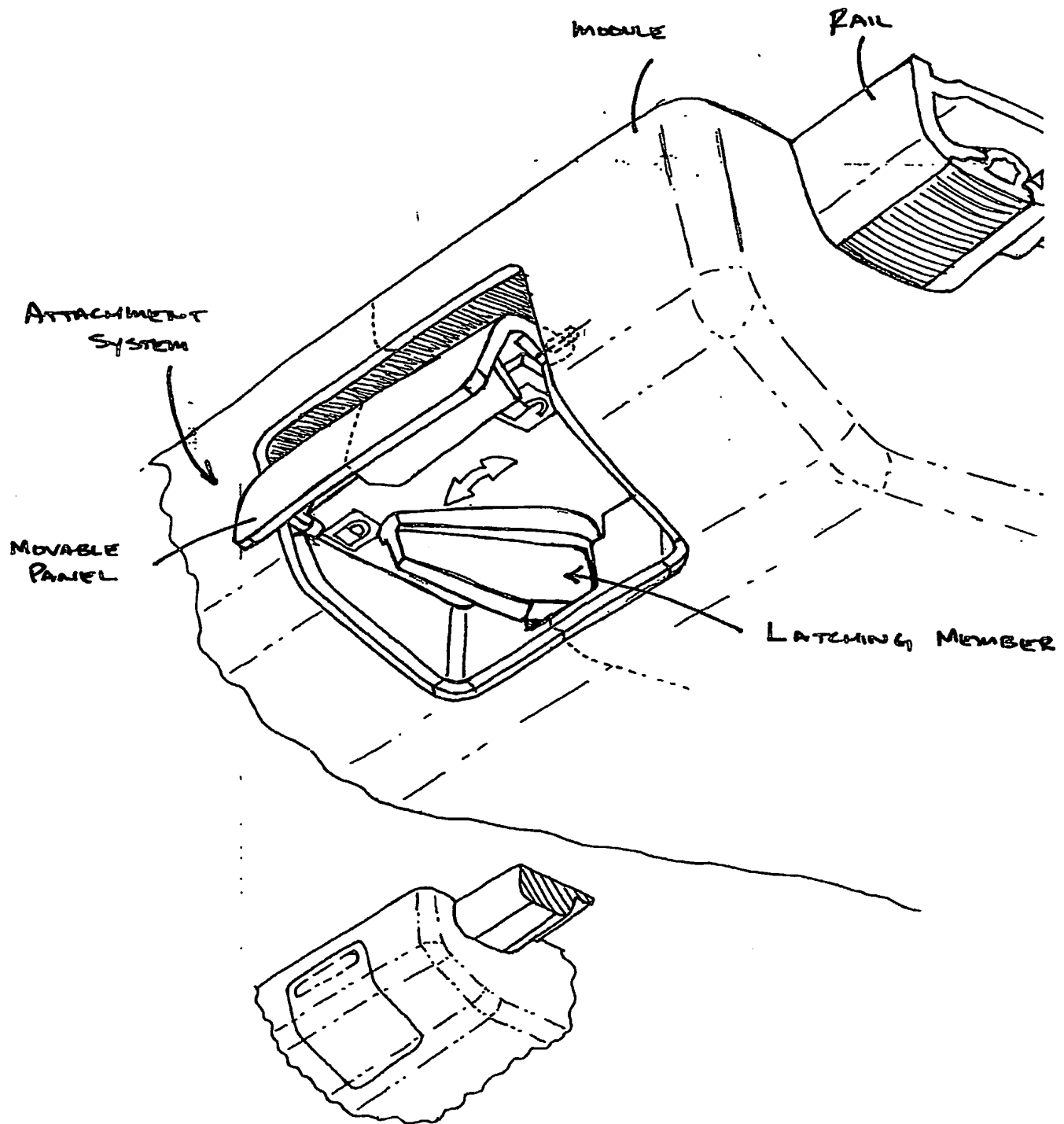


FIGURE 9

9/26

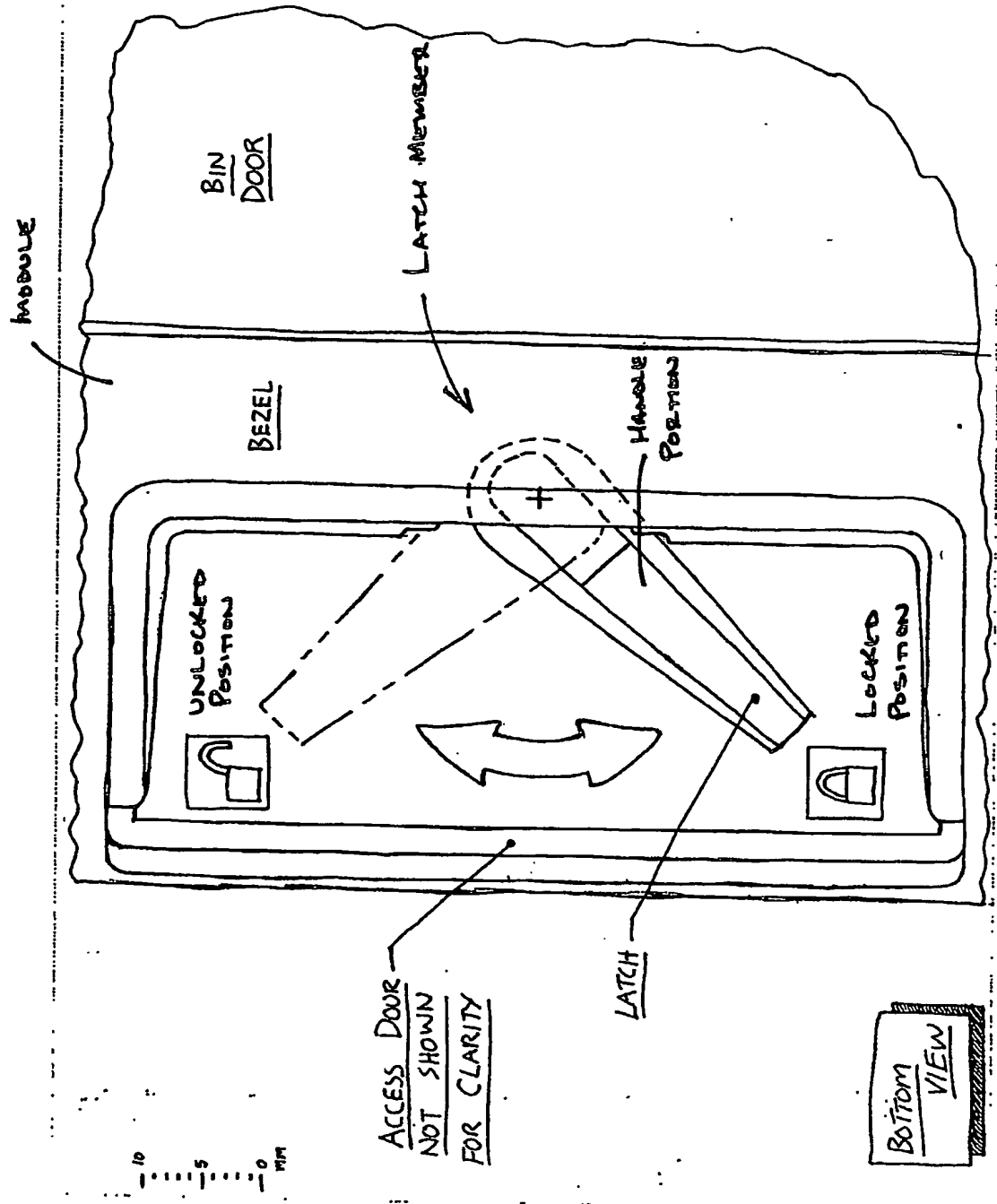


FIGURE 10

10/26

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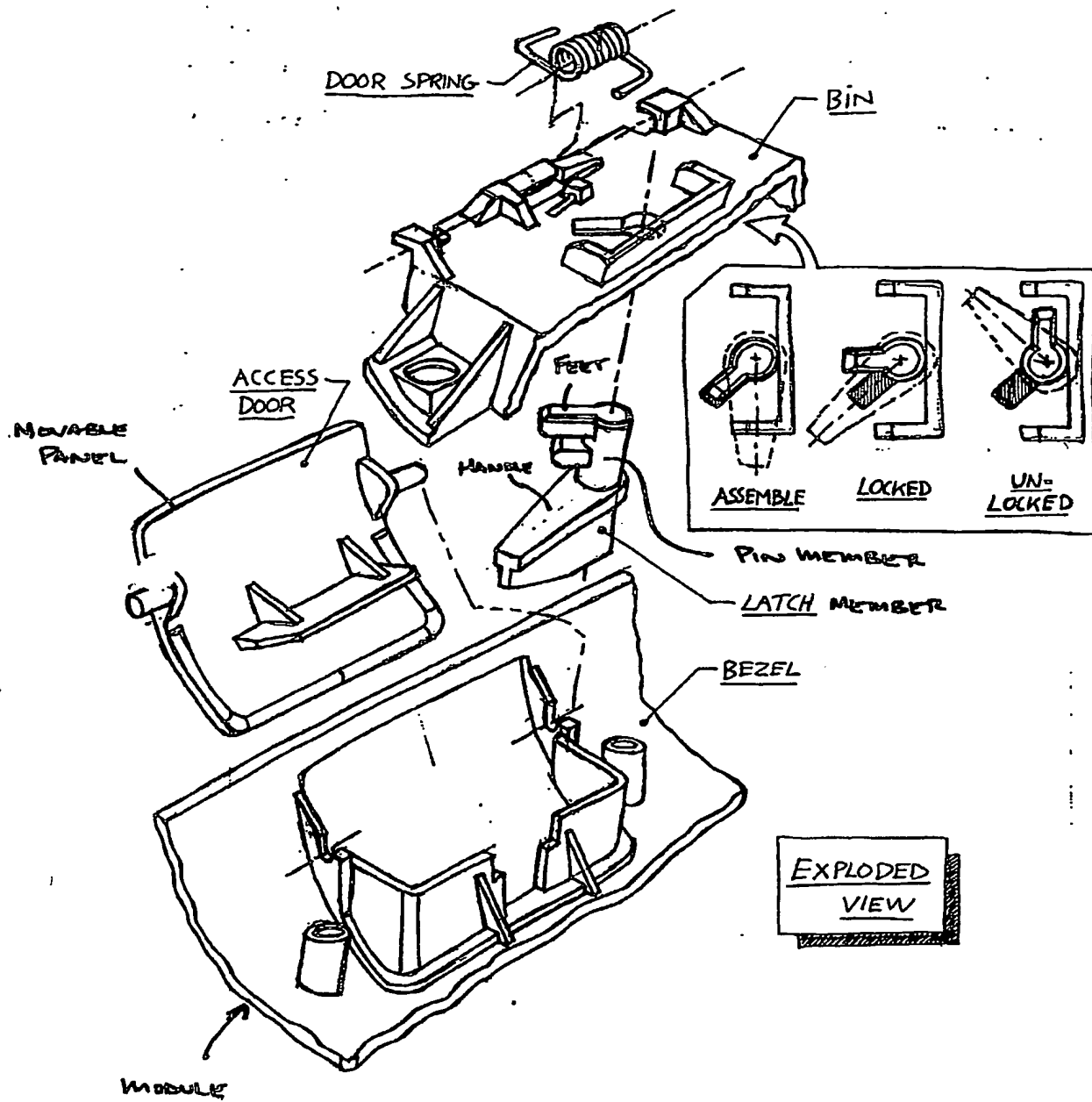


FIGURE 11

11/26

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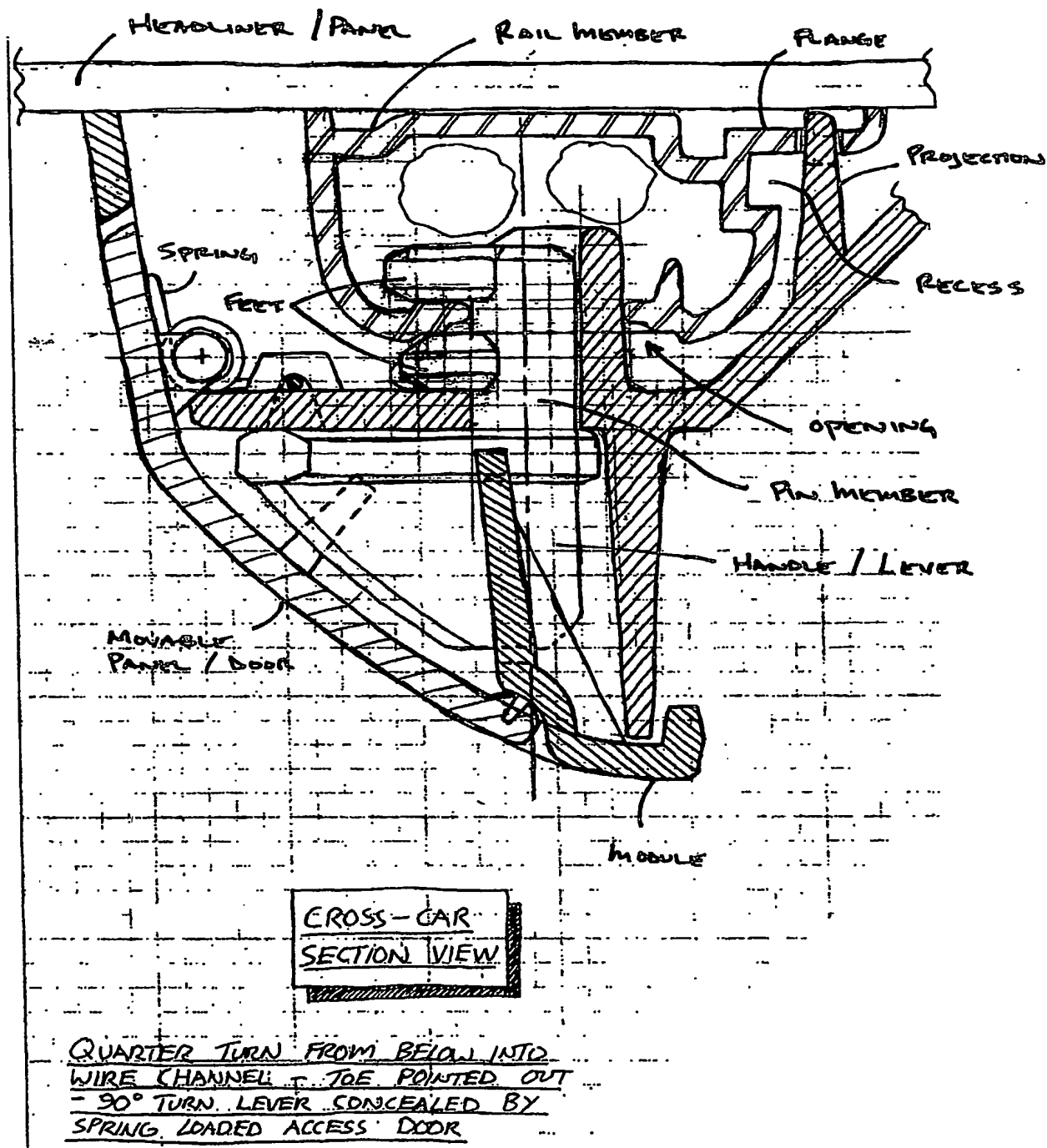
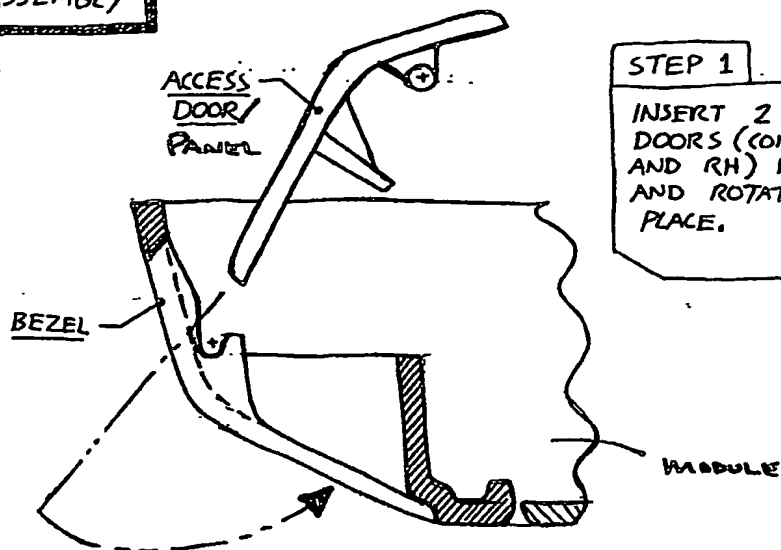


FIGURE 12

## ASSEMBLY

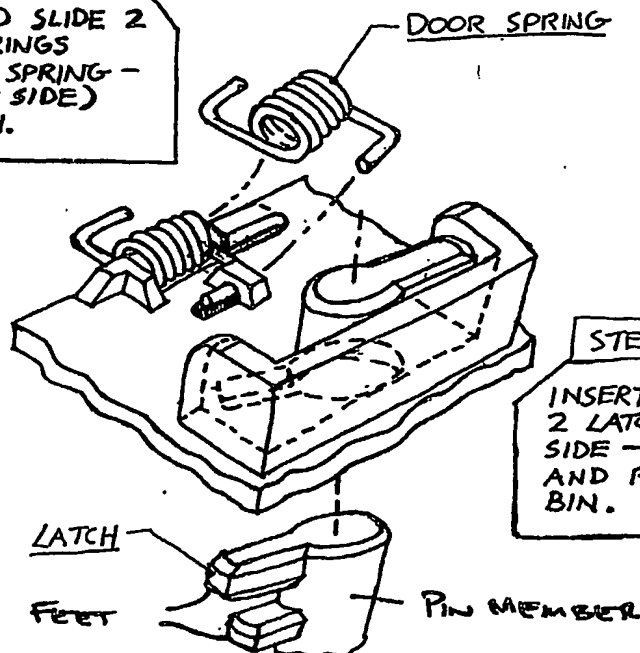


## STEP 1

INSERT 2 ACCESS DOORS (COMMON LH AND RH) INTO BEZEL AND ROTATE INTO PLACE.

## STEP 2

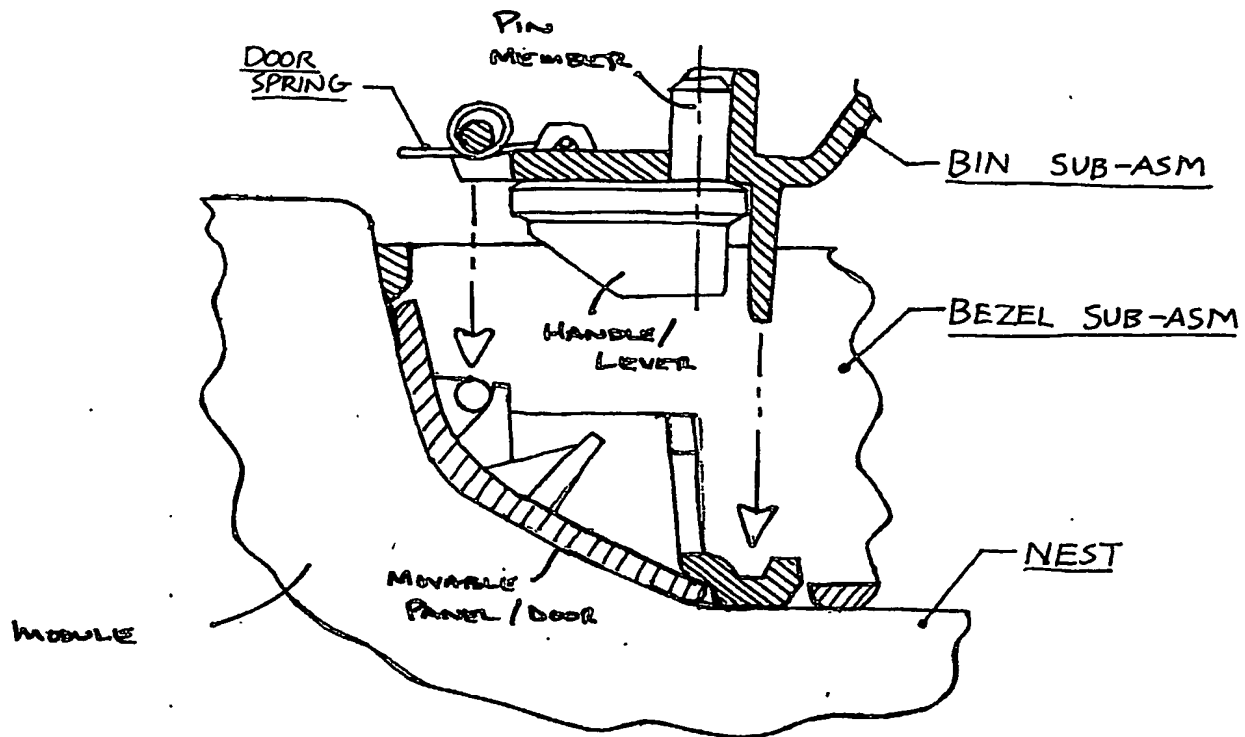
PLACE AND SLIDE 2 DOOR SPRINGS (COMMON SPRING - ONE PER SIDE) INTO BIN.



## STEP 3

INSERT AND ROTATE 2 LATCHES (ONE PER SIDE - COMMON LH AND RH) INTO BIN.

FIGURE 13

**STEP 4**

Z-LOAD BIN SUB-ASM INTO BEZEL SUB-ASM (PRELOADING THE DOOR SPRING AGAINST THE ACCESS DOOR IN THE PROCESS). HEATSTAKES THEN SECURE THE ENTIRE ASM.

FIGURE 14



14/26

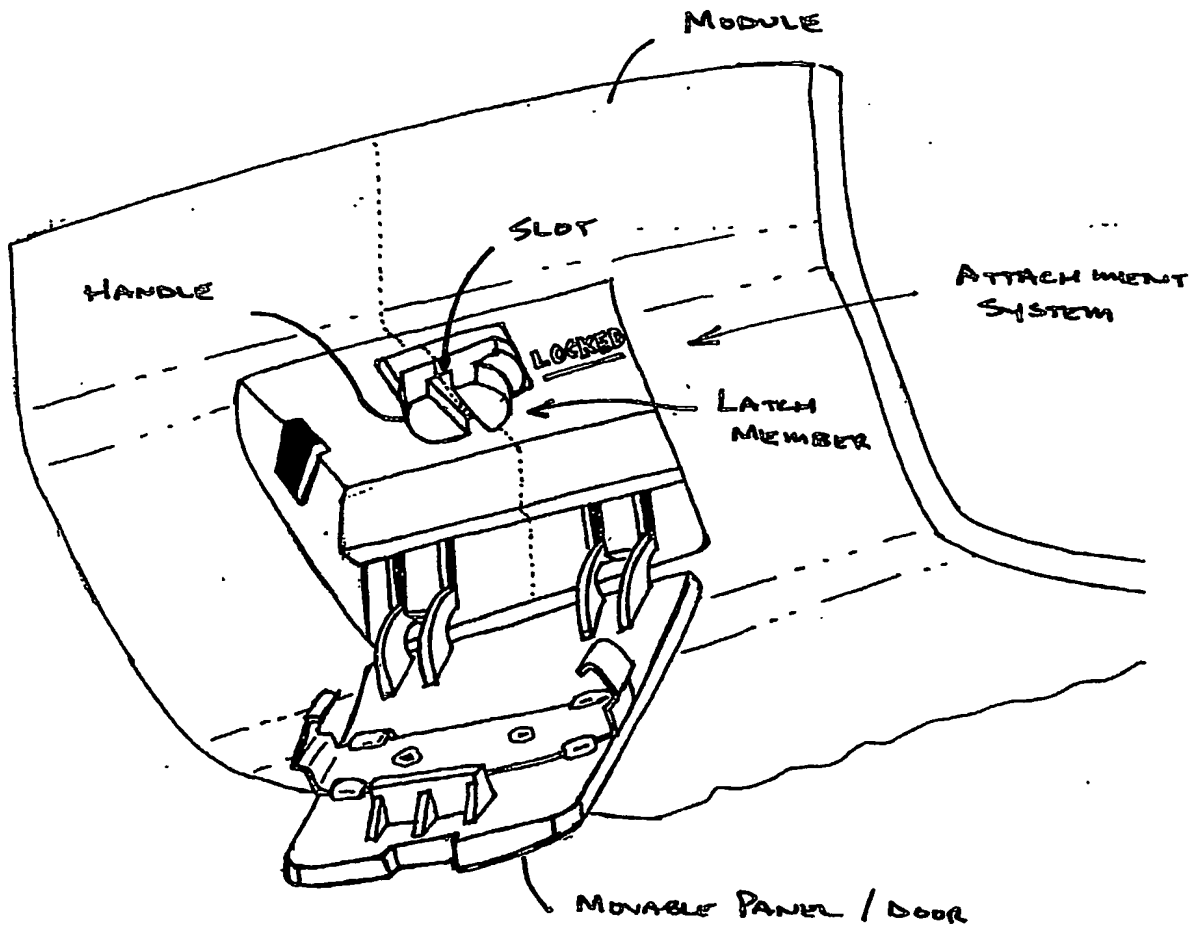


FIGURE 15

15/26

BIN ATTACHMENT CONCEPT :  $\frac{1}{4}$  TURN FROM BELOW

- INTO SIDE FLANGE

TDE POINTED OUT - FLATHEAD CONCEALED BY ACCESS DOOR

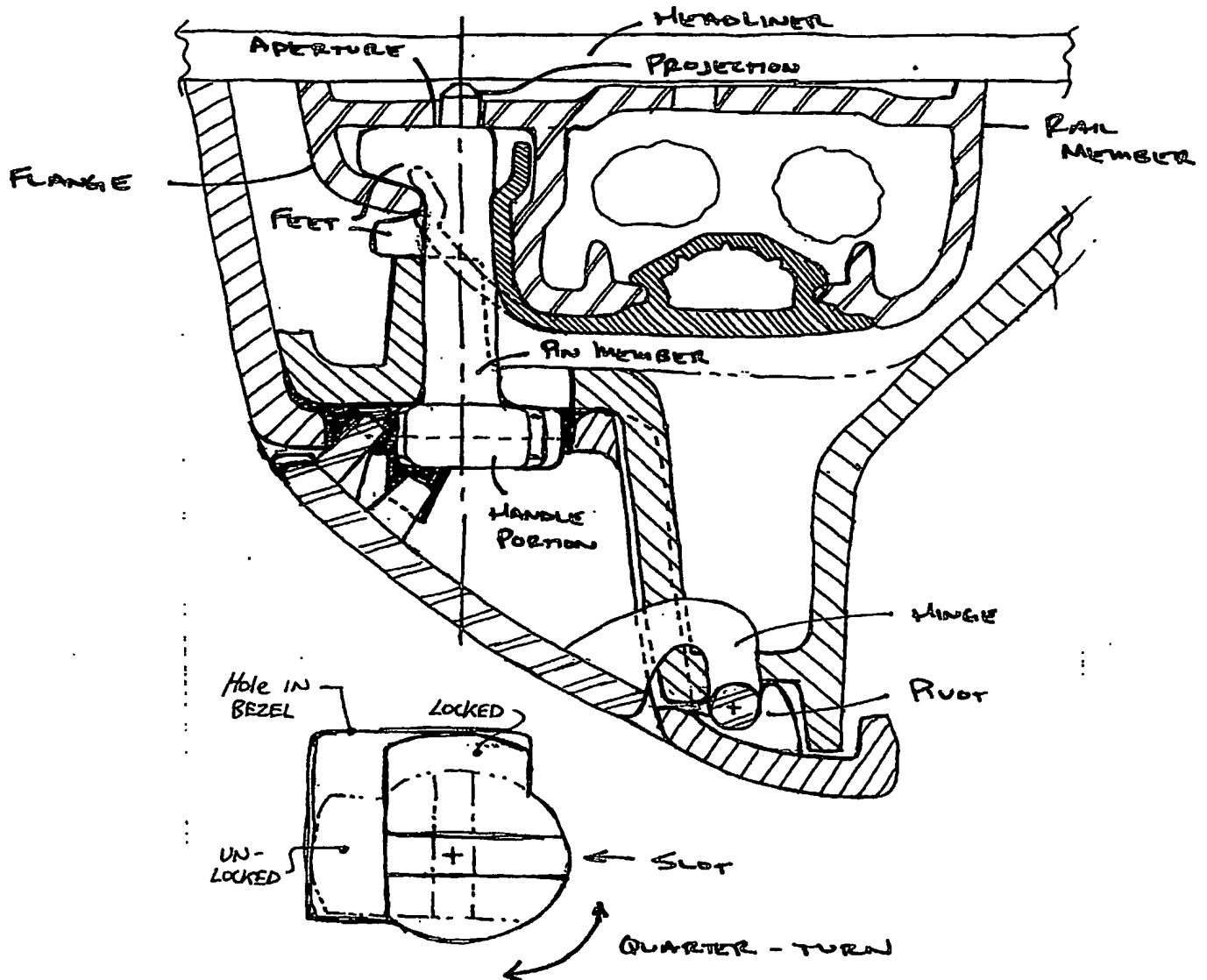


FIGURE 16

16/26

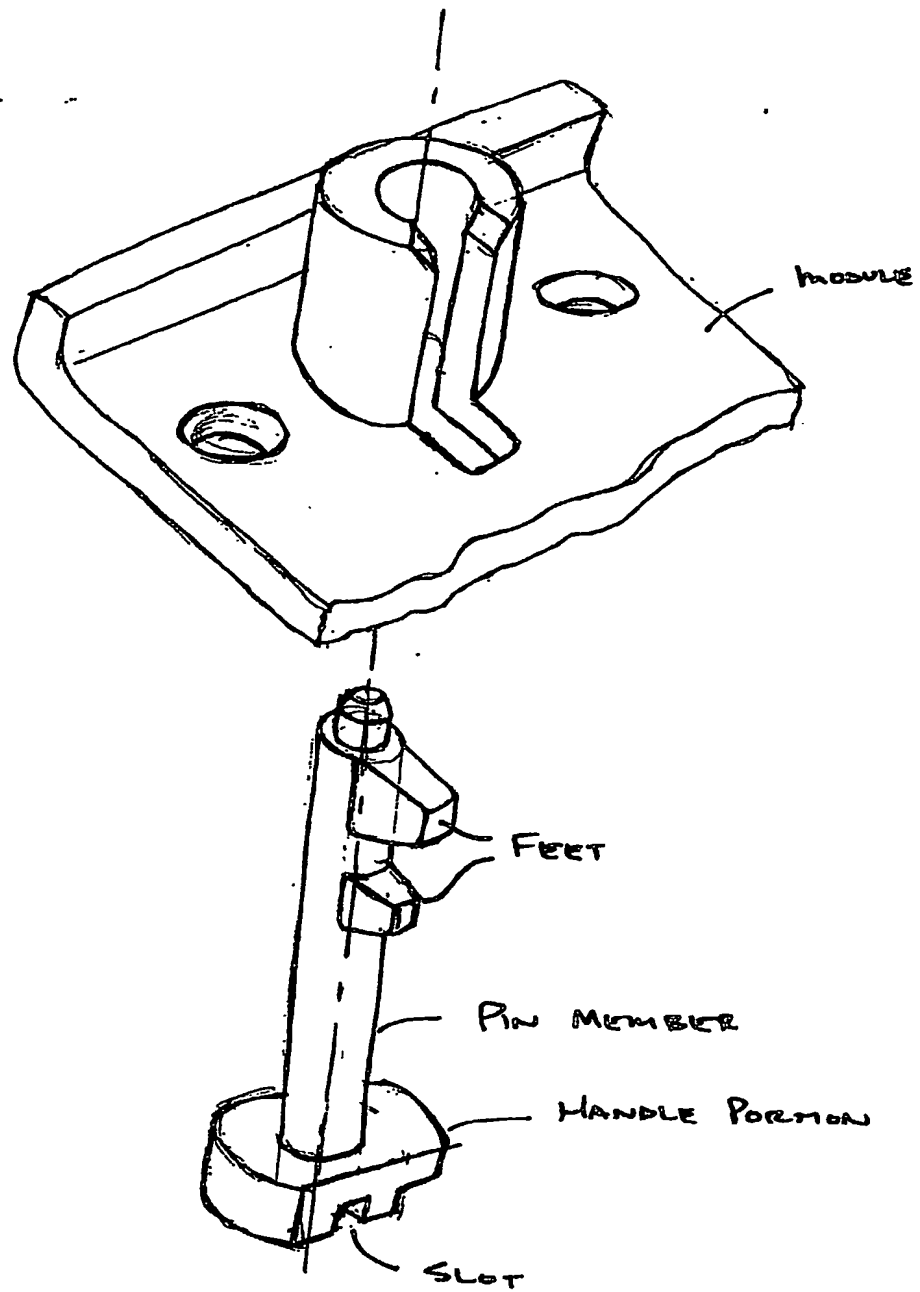


FIGURE 17

17/26

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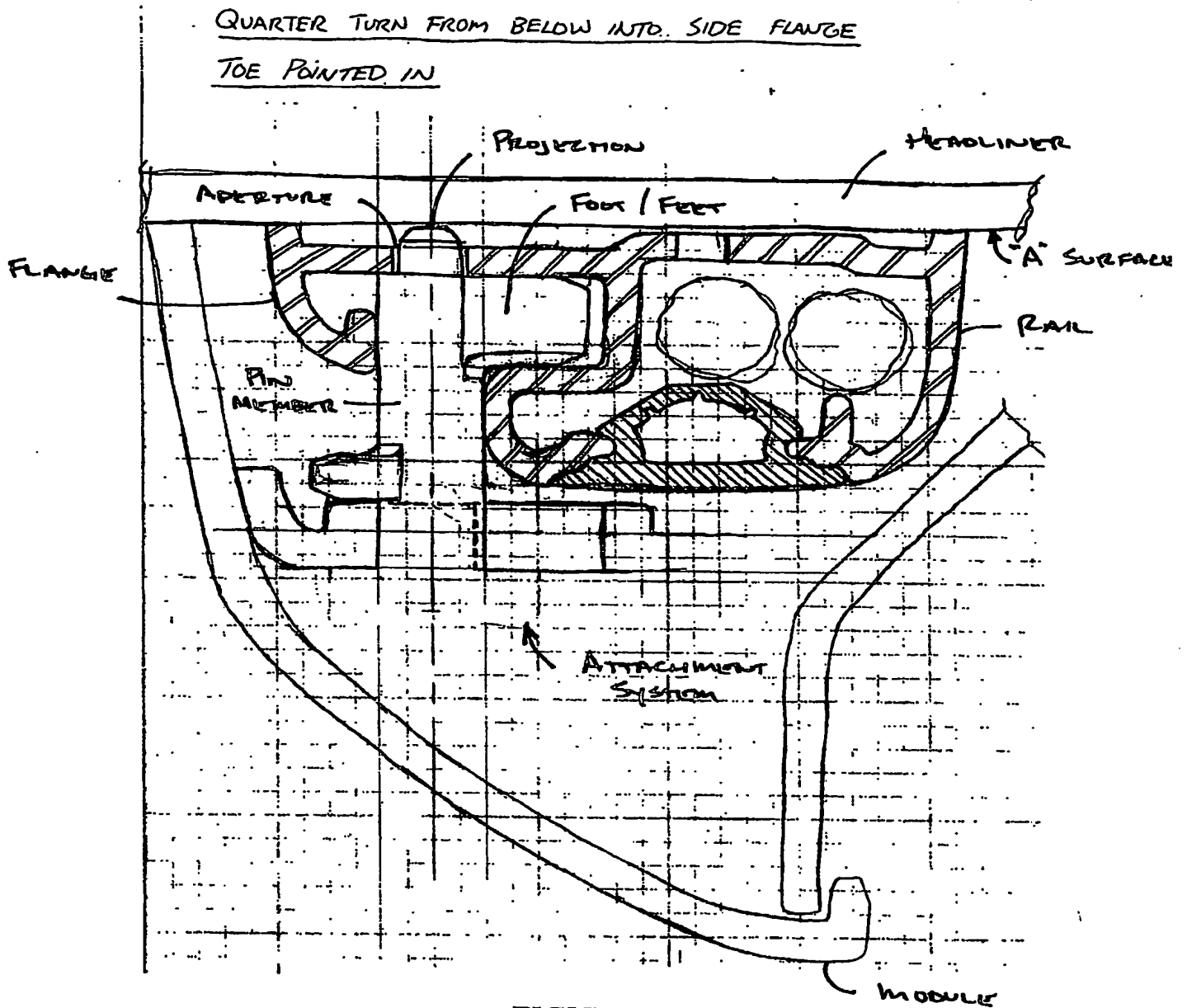


FIGURE 18

18/26

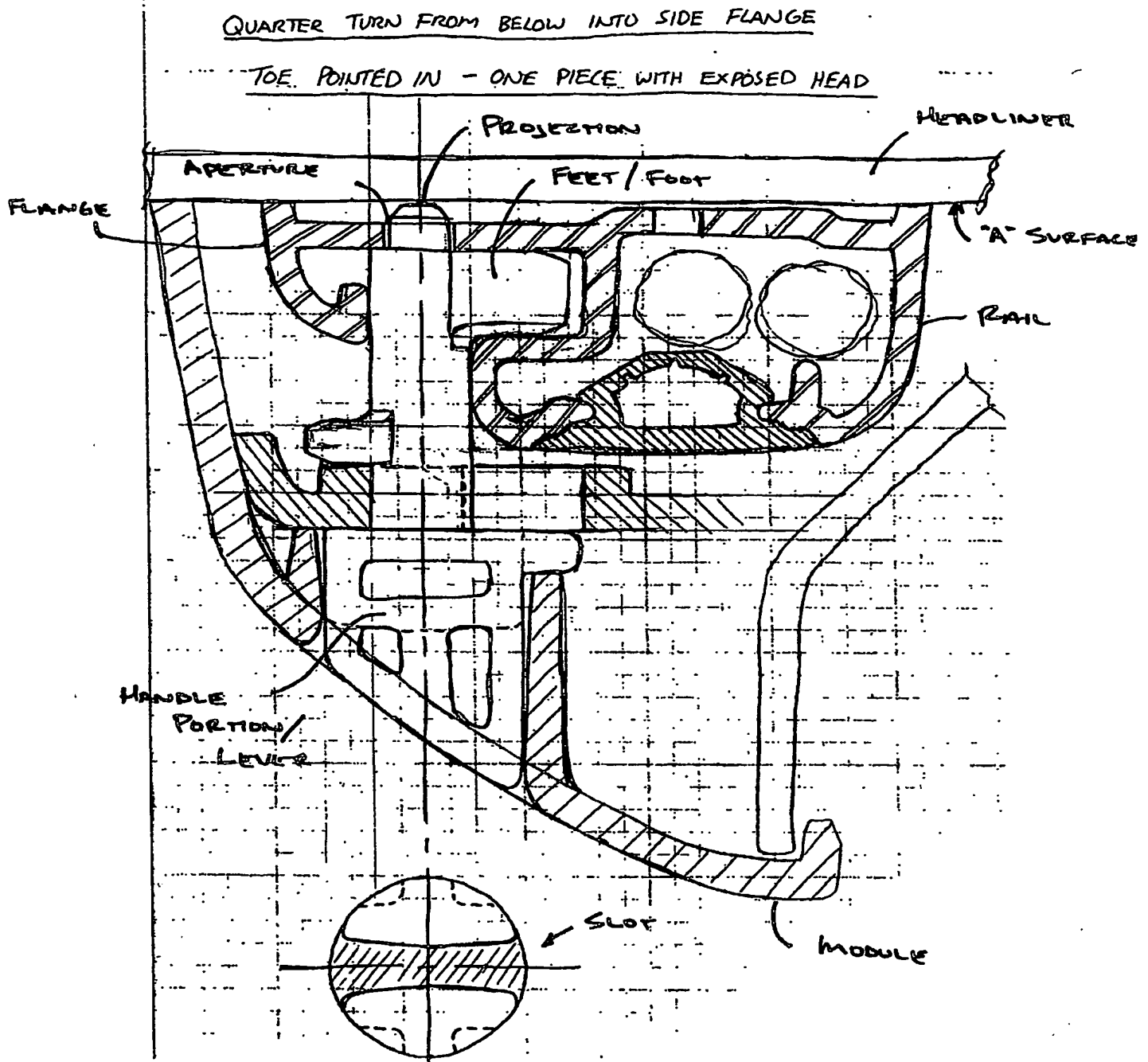


FIGURE 19

19/26

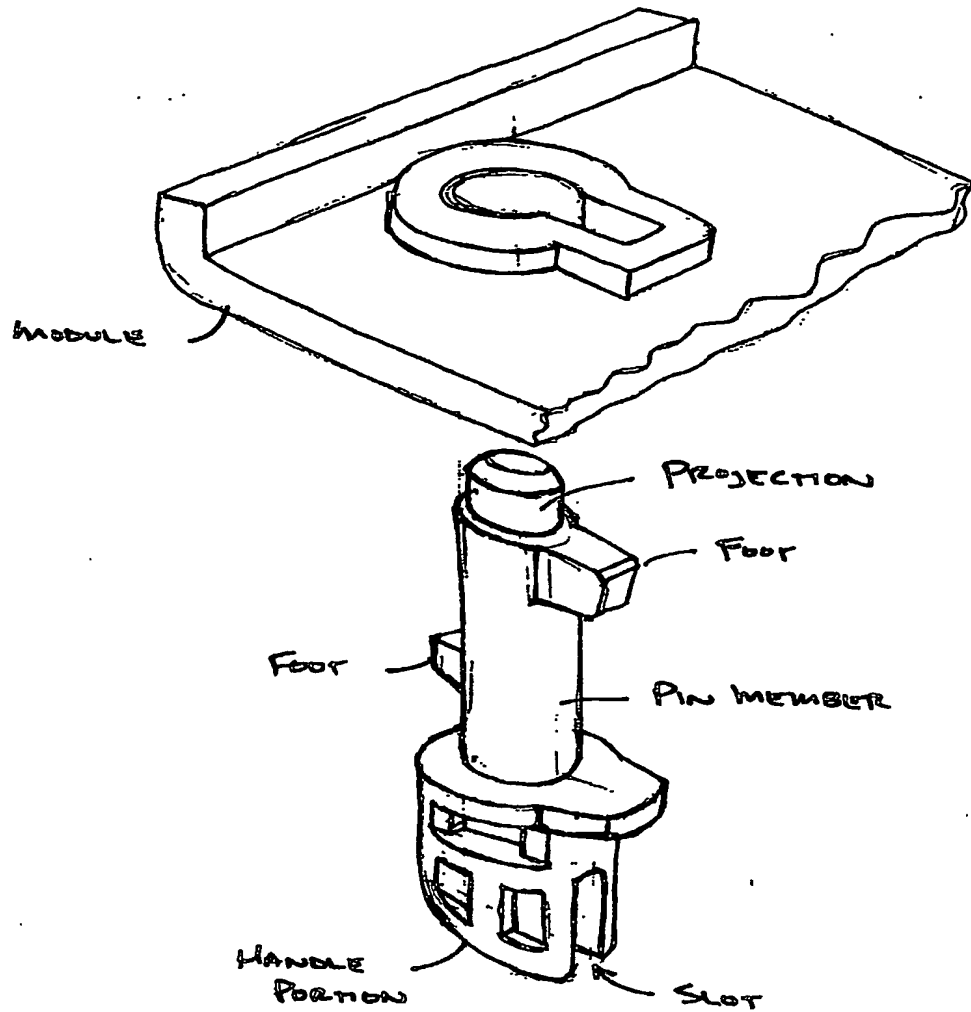
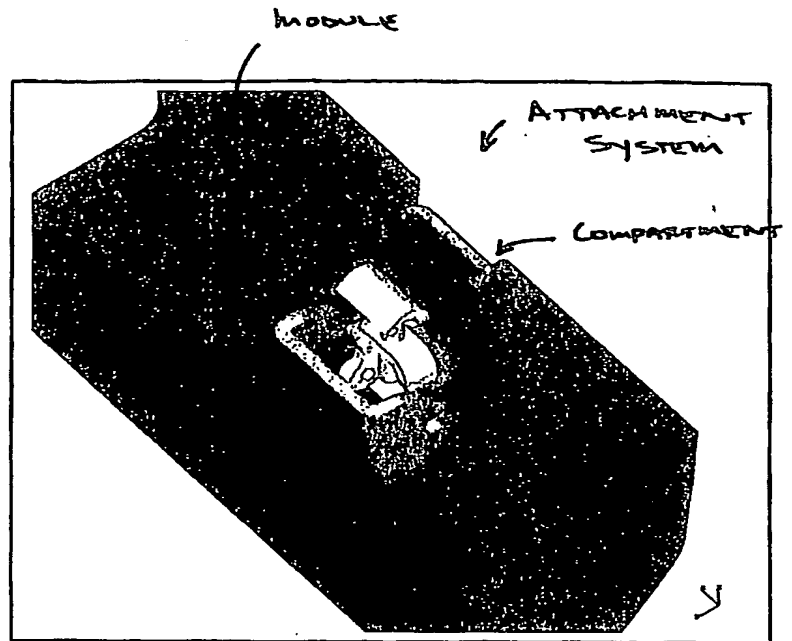
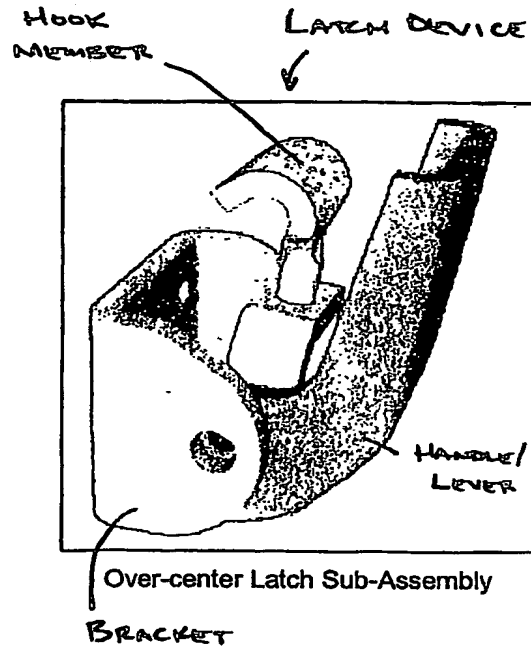
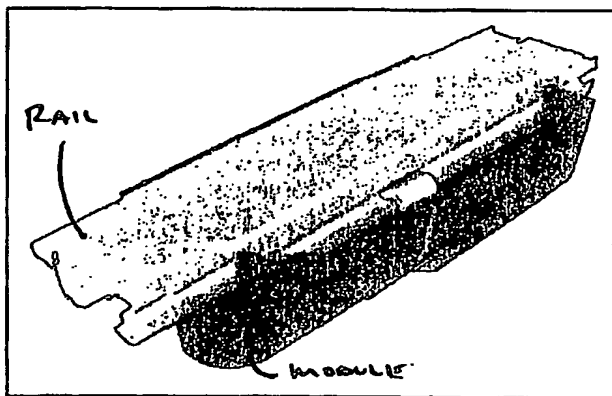


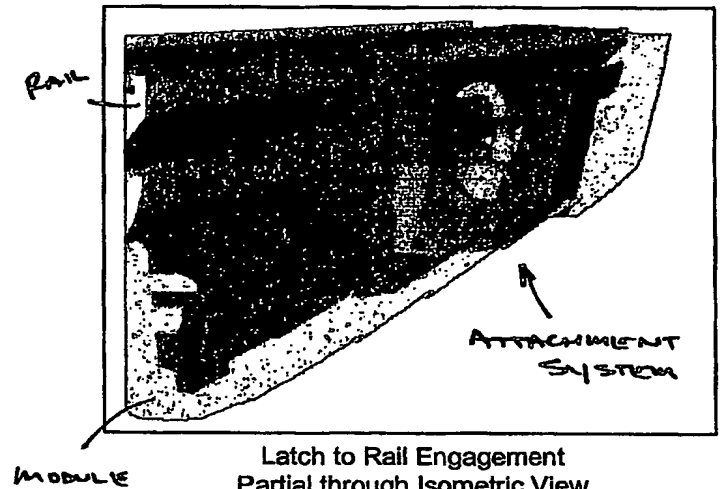
FIGURE 20



Backside Partial Isometric View of Latch in Rail Module



Latch to Rail Engagement  
Partial Backside Isometric View



Latch to Rail Engagement  
Partial through Isometric View

FIGURE 21

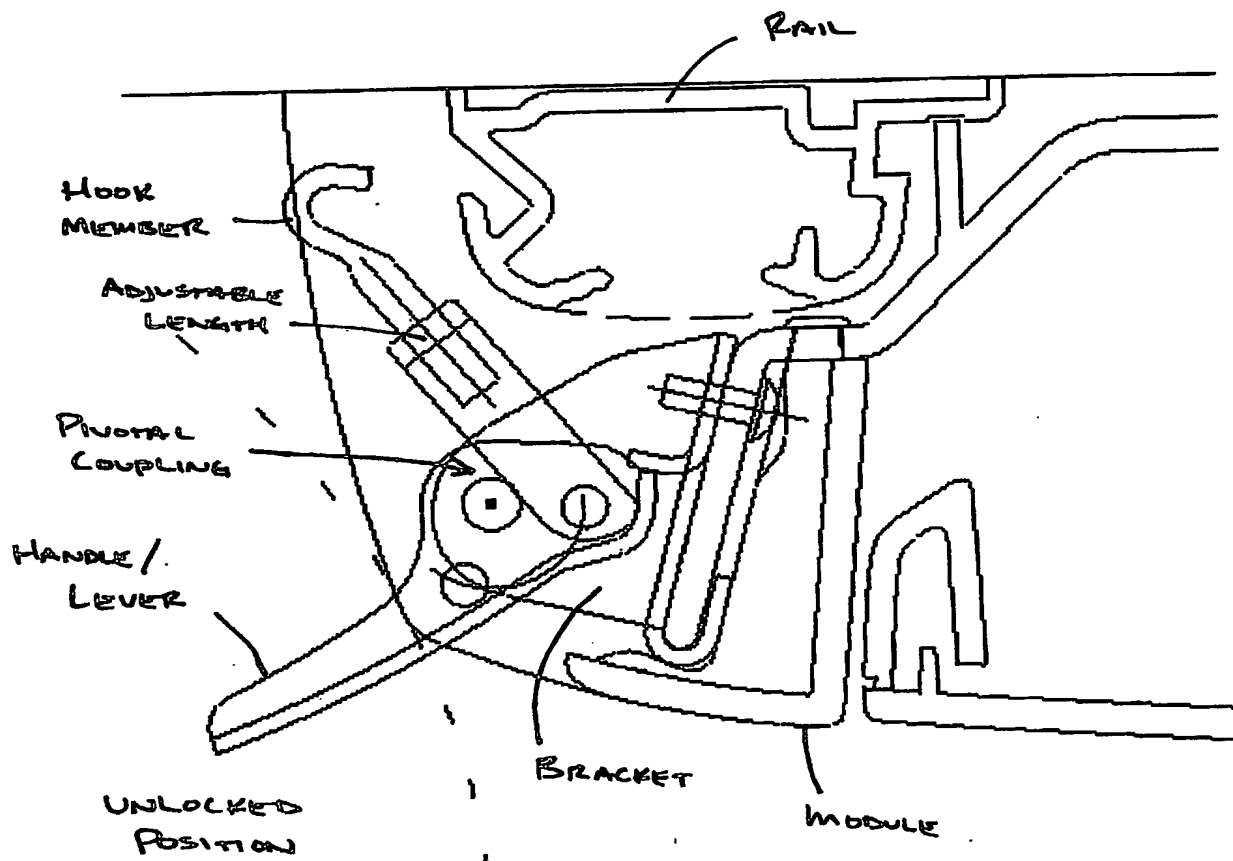


FIGURE 22A



22/26

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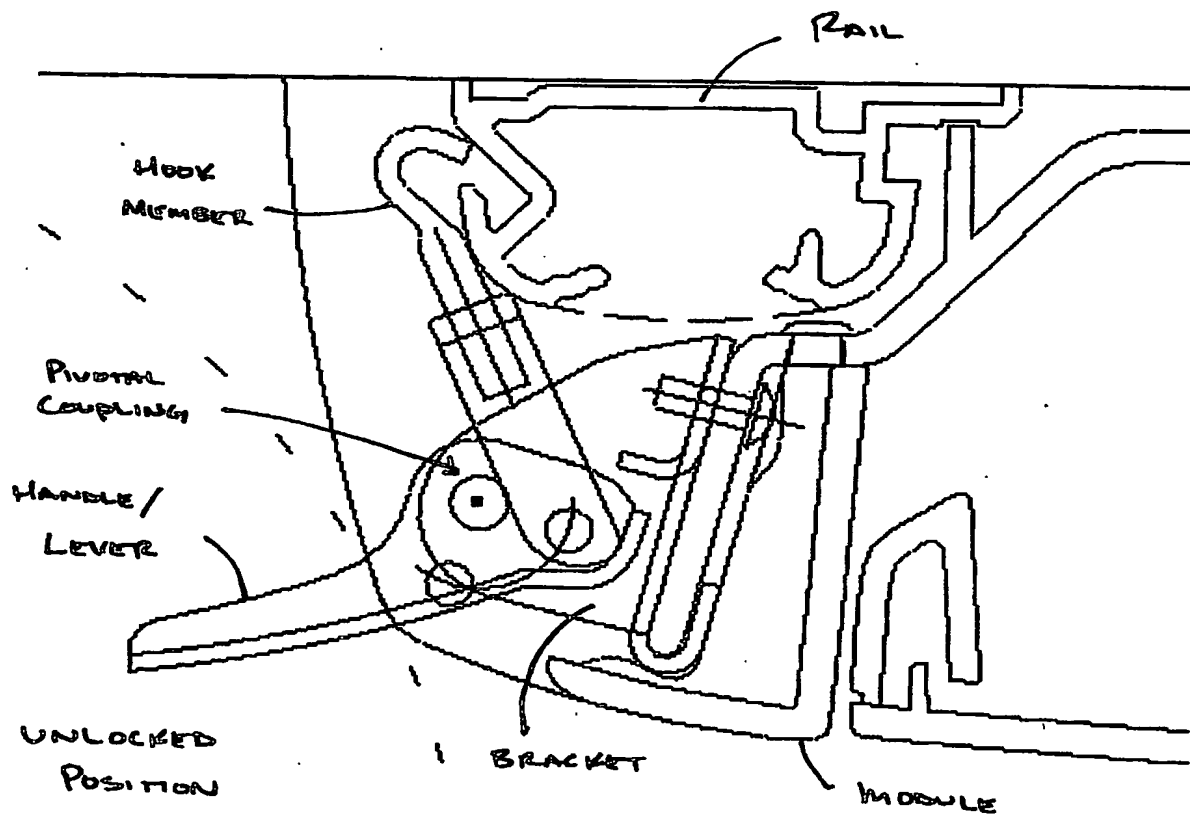


FIGURE 22B

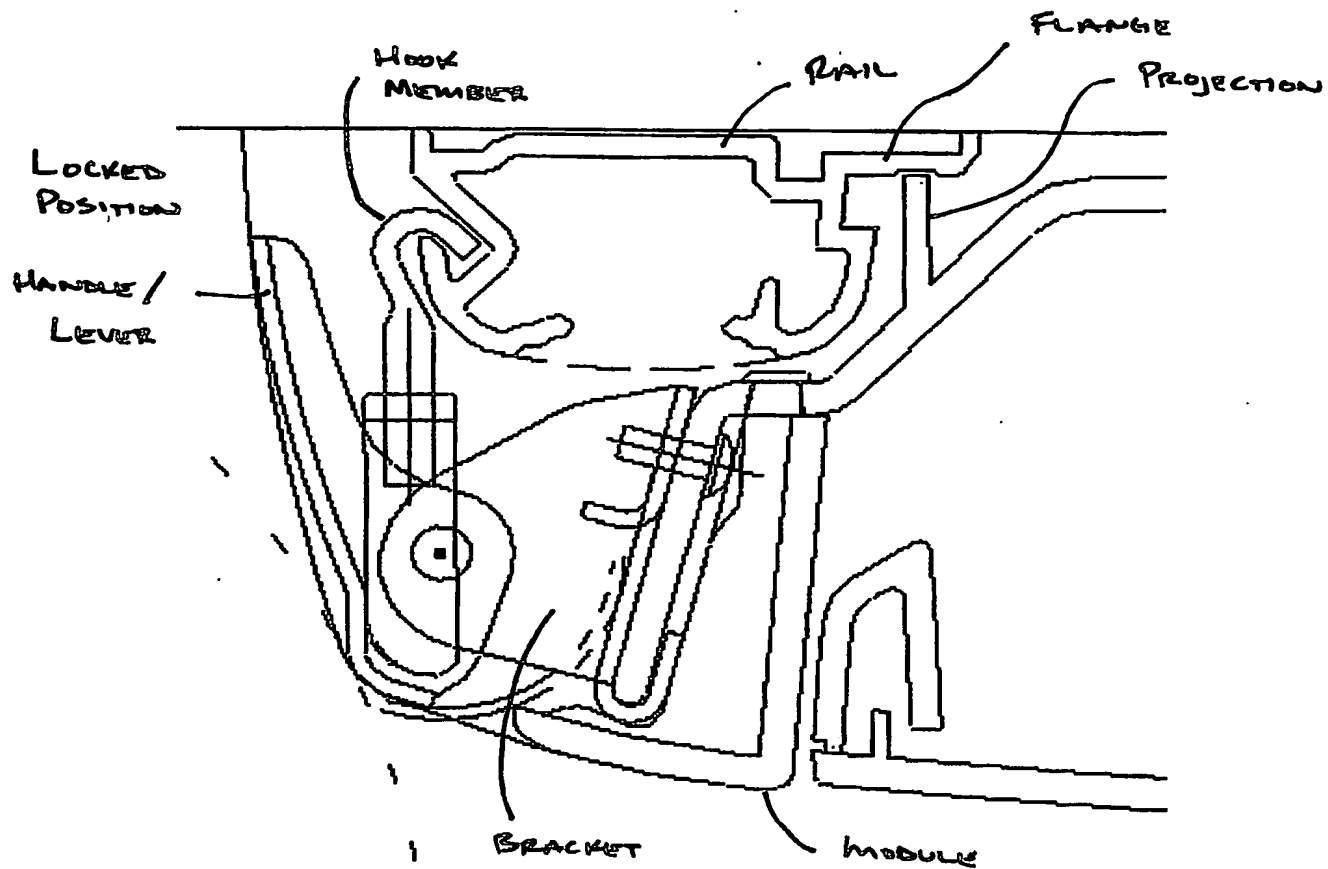


FIGURE 22C

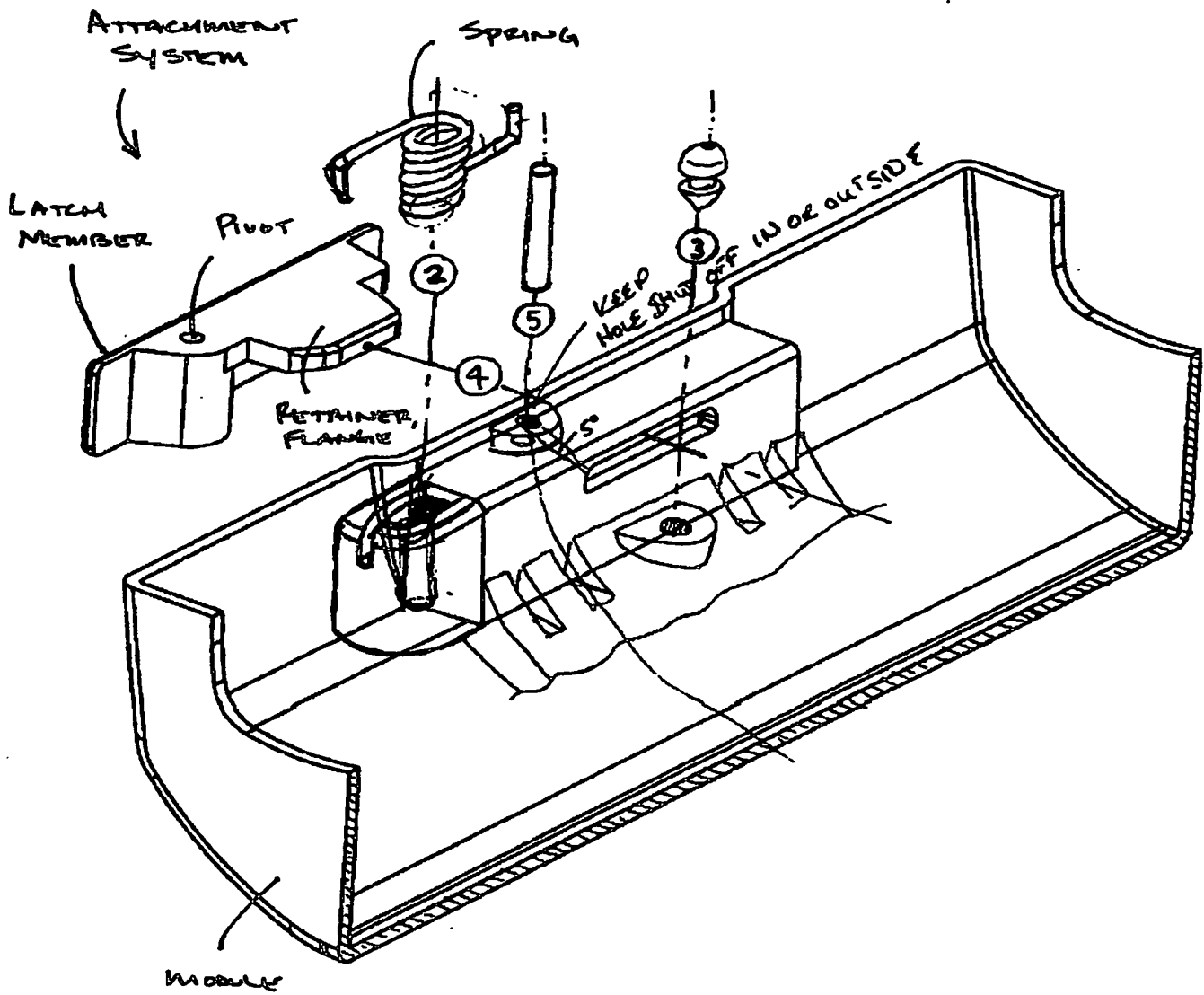


FIGURE 23

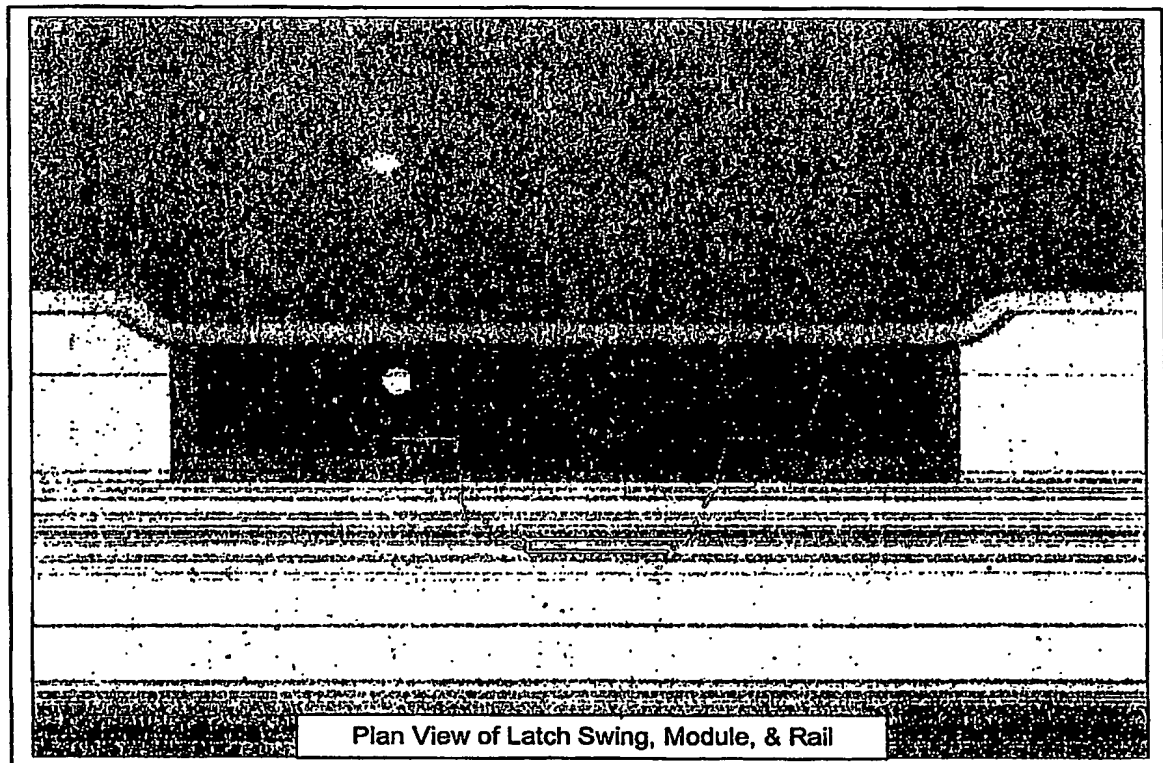
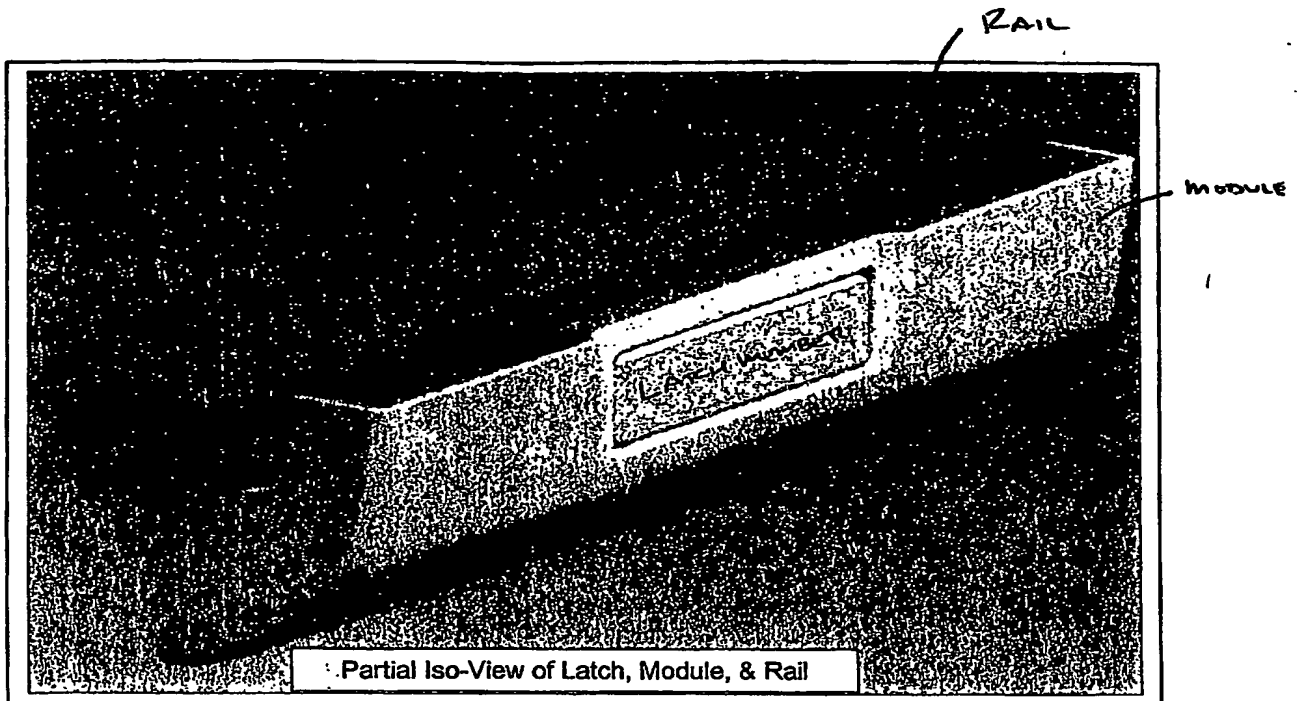


FIGURE 24

26/26

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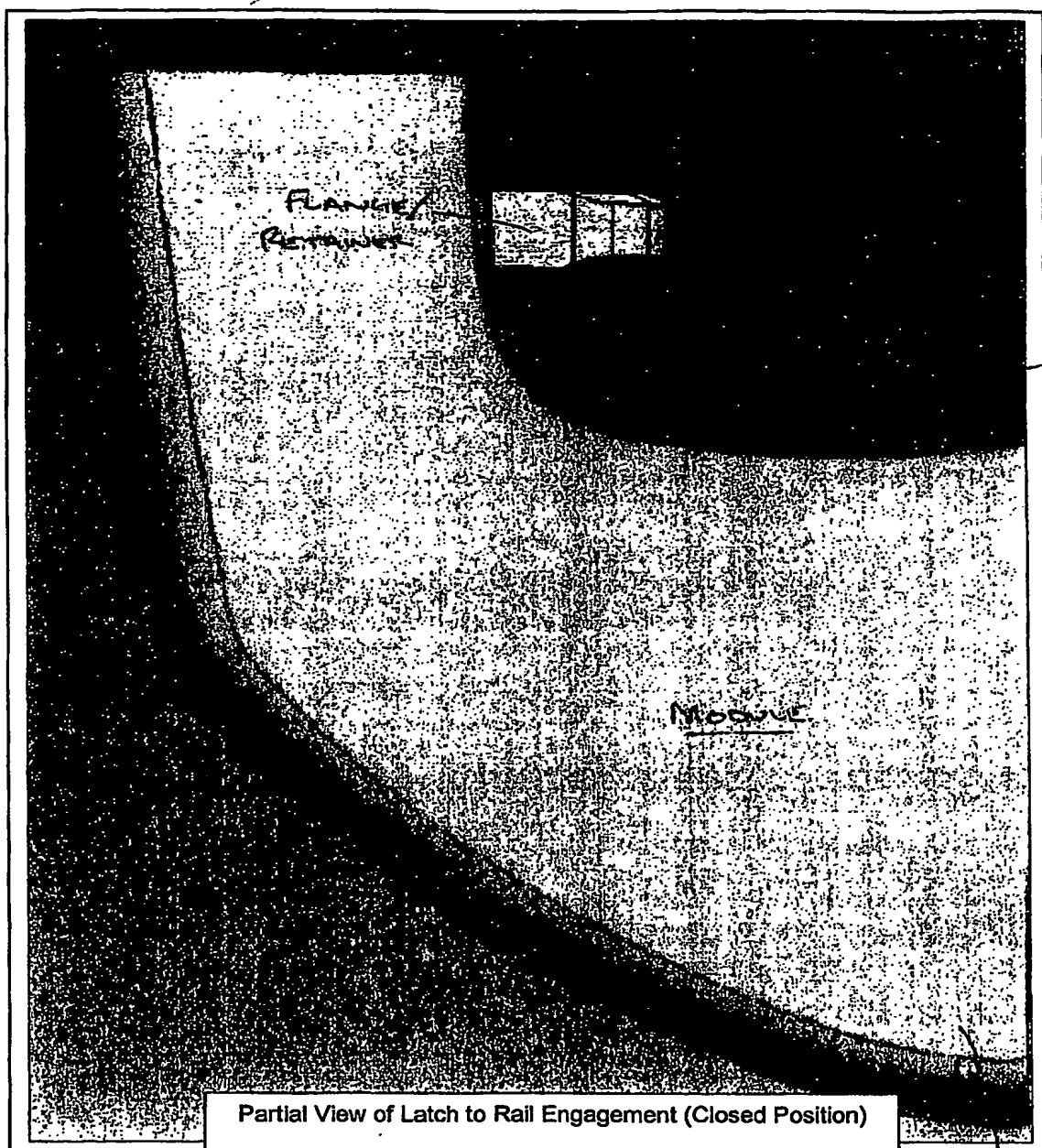


FIGURE 25

MODULE

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